Volume XXVII ~ *Number Three* *Autumn 1948*

Bell Telephone MAGAZINE

How Western Electric Serves Telephone Users
CLIFTON W. PHALEN

A Design for Living • THERESA E. BODEN

Sorting Two-and-a-half Billion Tickets a Year
FREDRIC M. BIATHROW AND F. RAYMOND BREWSTER

Promoting Safety in Our Automotive Fleet
ERLE S. MINER

Most People Are Honest • H. MONTAGUE POPE

Telephones of the World • JAMES R. MCGOWAN

American Telephone & Telegraph Company · New York

Bell Telephone Magazine

Autumn 1948

How Western Electric Serves Telephone Users,
Clifton W. Phalen, 141

A Design for Living, *Theresa E. Boden,* 148

Telephone City, 162

Sorting Two-and-a-half Billion Tickets a Year,
Fredric M. Biathrow and F. Raymond Brewster, 164

Promoting Safety in Our Automotive Fleet,
Erle S. Miner, 172

Most People Are Honest, *H. Montague Pope,* 185

Telephones of the World, *James R. McGowan,* 192

Twenty-five Years Ago in the Bell Telephone Quarterly, 202

A Medium of Suggestion & a Record of Progress

Published for the supervisory forces of the Bell System by the Information Department of American Telephone and Telegraph Co., *195 Broadway, New York 7, N. Y.*
Leroy A. Wilson, *President;* Carroll O. Bickelhaupt, *Sec.;* Donald R. Belcher, *Treas.*

Who's Who & What's What

in This Issue

THE BELL SYSTEM is a big outfit, of necessity, for it serves a big country. But the units which comprise it are relatively few, and the relationships among them are simple and straightforward. The place of one of the companies—Western Electric—in the System scheme of things is discussed by CLIFTON W. PHALEN, who has been since last August A. T. & T. Vice President in charge of Public Relations. Just 20 years earlier, he had joined the New York Telephone Company as a lineman, and within the next 10 years he had progressed through that company's Plant Department to become division construction superintendent of the eastern division. He became division plant superintendent in the same division in 1939, and in 1943 made the shift to the Personnel Department as assistant vice president. There he became vice president in 1944, and his transfer to Vice President in charge of Public Relations of the New York Company preceded by three years his election to similar office in the A. T. & T. Company.

BEGINNING her career with the Bell System in Philadelphia in 1919, when she was employed by the Bell Telephone Company of Pennsylvania in the Benefit and Medical Department, THERESA E. BODEN was transferred in 1922 to the Comptroller's Department of the American Telephone and Telegraph Company, where she worked on benefit and medical studies. In 1926 she went to the New England Telephone and Telegraph Company as western division traffic employment supervisor. Four years later she rejoined the A. T. and T. Company, going to the Personnel Relations Department to assist in the development of the expanding health education program. As staff assistant to the medical director, her work now includes the direction of the Bell System program for health education and related activities, and assistance to the

Clifton W. Phalen

Theresa E. Boden

Fredric M. Biathrow

F. Raymond Brewster

Erle S. Miner

H. Montague Pope

Associated Companies in the development of women to fill staff positions.

FREDRIC M. BIATHROW joined the Accounting Department of the New York Telephone Company in 1929. There staff and field assignments on revenue accounting work in that company's Long Island Area brought him experience in all phases of this branch of the accounting job. In 1946 he transferred to the methods staff of the Comptroller's Department of the A. T. and T. Company; and here he has been engaged in the development of improvements in the method of ticket sorting —the general subject of the article of which he is the co-author—and in a study of the application of punched card machine methods to customer billing work.

THE BELL SYSTEM CAREER of F. RAYMOND BREWSTER started in the Accounting Department of the New York Telephone Company in 1899, but was interrupted when he entered the public accounting field in 1904. Returning to the New York company in 1906, he progressed through field and methods staff positions in connection with customer accounting work, and in 1919 he joined the staff of the Comptroller of the American Telephone and Telegraph Company, in charge of customer accounting methods. During the ensuing years the practices of the Bell System have undergone fundamental changes, including the substitution of small stubs in place of heavy ledgers for keeping customers' accounts, and also the adoption of "rotation" billing and the use of machines in place of longhand entries. In 1936 he was appointed general supervisor of methods in the Comptroller's Department, and in 1943 he was appointed accounting personnel assistant in

(Continued on page 204)

James R. McGowan

An inspector checks the adjustment of a unit of dial switching equipment to within thousandths of an inch before it leaves Western Electric's Hawthorne Works. Such precision is an essential factor in enabling the Bell System's operating companies to provide swift telephone connections and clear transmission over distances short or long. *See the article beginning on the opposite page*

As an Integral Part of the Bell System, Our Manufacturing And Supply Unit Has a Vital Share in Providing the Best Telephone Service at the Lowest Possible Cost

How Western Electric Serves Telephone Users

Clifton W. Phalen

THE JOB OF THE BELL SYSTEM is to provide good telephone service—the kind that causes people to say of it, "That's good. That's fine."

To help carry out this job the Western Electric Company—the manufacturing and supply unit of the System—furnishes to the operating telephone companies most of the equipment they use. Western Electric has been a part of the System for more than 65 years.

How does this set-up contribute to giving telephone users the kind of service they want? One way to answer the question is to list some of the things that people have made it clear they want, and then consider Western's work in relation to each.

First of all, the average person wants his service installed as promptly as possible after he has ordered it.

When he uses his telephone, he wants connections to go through quickly.

He wants to hear easily regardless of distance.

He wants dependable service—steady and reliable.

He would like the service to show continuous improvement—to be "up-to-date" and not behind the procession.

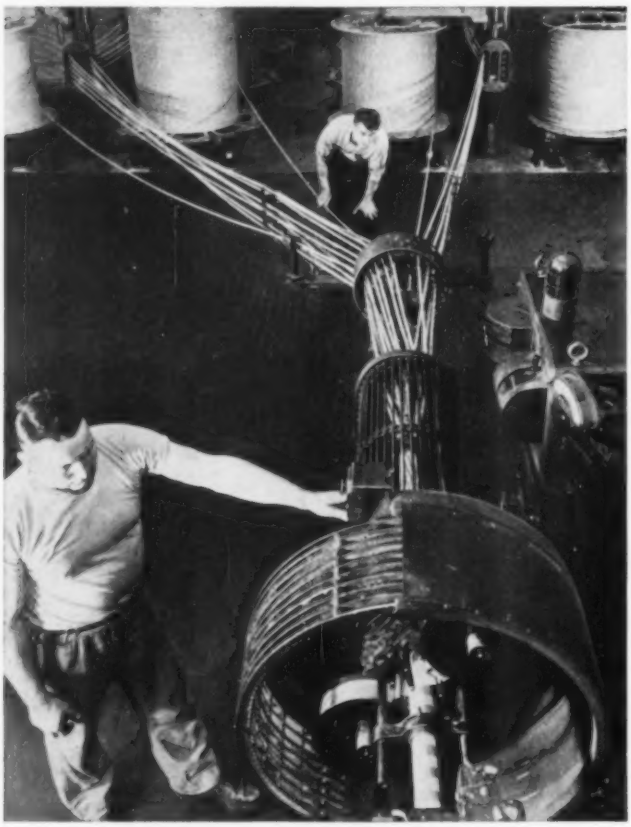
And of course he wants his bill to be as low as possible.

Meeting these wants and expectations is naturally the purpose of all branches of the Bell System. But for the moment, let's just consider Western Electric's contribution.

Providing Service as Promptly as Possible

HAVING WESTERN a part of the System has helped tremendously to get service to people as fast as possible. Experience since the war is a good illustration.

In this post-war period the Bell companies have faced an overwhelming demand for service—the greatest in history. And in response to this demand they have added far more



As part of its post-war expansion to meet its responsibilities to the Bell System, Western Electric doubled its installation of cabling machines such as this, each costing $177,000. The one pictured here is twisting 18 cable units into the core of an 1818-pair cable

telephones than ever before—about nine million in three years.

This is really a staggering achievement. To accomplish it, the companies have had to obtain and install enormous quantities of central office and outside plant apparatus and equipment, in addition to the telephones themselves. It is true that, in spite of all our efforts, many customers have had to wait. But it is also true that we have served millions of people far more rapidly than we could possibly have done if the System had not had its own manufacturing and supply company.

After the war a very great—and very fast—expansion of manufacturing facilities was needed to push the production of telephone equipment up to unheard-of quantities. Just suppose that the System had had to rely on outside manufacturers. They would have had to weigh carefully the long-run risk to themselves in expanding to meet our current needs. They would have had to balance their other opportunities, and the wants of their other customers, against the wants of the Bell companies. It is inconceivable that they would have been willing, to the same degree or with the same speed, to plunge into the gigantic task that Western Electric undertook.

Western met the problem head-on. It immediately expanded manufacturing facilities and took all the risks required to push production up. The result was that it speedily broke all previous production records by a wide margin. By 1947 it was turning out more than five times as much dial central office equipment as in an average year before the war, nearly ten times as many manual switchboards, and more than three times as much cable and wire. Such performance has enabled the operating telephone

companies to serve millions of people much more quickly than would otherwise have been possible. And if Western Electric were not a part of the Bell System, as the right arm is part of the body, it could not have thus accepted its responsibility to take full part in the telephone job.

Western Electric's ability to speed equipment to repair the ravages of disaster contributes immeasurably to the dependability of Bell System service. This picture shows 15 tons of wire and other material being loaded for delivery by air to a storm-stricken area

Fast Connections and Clear Transmission

WHEN A person gets his telephone, he wants to be able to reach other people quickly and hear them easily, whether he calls a neighbor across the street or a cousin across the country. How does Western Electric help him to do so? Let's see.

Take the dialing of a number. The housewife who is calling the local grocer probably hasn't the faintest idea that by the time she hears the dial tone—even before she turns the dial—an astonishing number of electrical connections have been set up in perfect sequence, and with remarkable speed, so that she may proceed to make the call. When the number is dialed, the switching contacts established during the next few seconds may run into the thousands. The movement of moving parts must be rapid, sure, precise. Contacts must be perfect. Control must be exact.

Since all parts of the telephone system are interconnected, every part must be in balance—in tune—with every other. The telephone system is like an orchestra with millions of instruments.

On the housewife's local call, the currents that flow through the train of connections are infinitely delicate and must be kept "just so" all along the line—and this would be true whether the call traveled two miles, or for two thousand or more.

The way a pair of wires is fastened on a pole 20 miles east of Boise,

Idaho, helps to determine how well Mrs. John Doe of Walla Walla, Washington, can hear her son who is calling her from Tiptonville, Tennessee.

When the temperature drops 20 degrees in Amarillo, Texas, the boy in Los Angeles says to the girl in New York, "Darling, your voice is so wonderful" because a tiny device that took years to perfect is built into the line and is automatically compensating for the effect of temperature changes on the flow of current.

These examples illustrate the point that to provide fast telephone service, with good "hearability," the equipment used *must* be of the highest quality and built to exact, uniform standards. And as a practical matter, the design, manufacture and operation of standard telephone equipment can be best accomplished when the designers, the makers, and the operating people work closely and continuously together on the same team.

This might be less important if the equipment needed were all very simple, or were non-specialized in character. But it isn't simple, and it's highly specialized. To make it rightly—to make it when and as needed—to make it as economically as possible—requires the undivided interest and attention of the maker, as well as his utmost skill. Likewise, the equipment must be economical to use and easy to maintain, and the manufacturer cannot cut corners on quality for the sake of reducing his costs or increasing profits. The fullest and free-est exchange of information between designer, maker, and user—with nothing held back because of differences of financial interest—is an important part of the process. This identity of interest and singleness of purpose assure the production of high quality, standard equipment as no other manufacturing arrangements could. They are the best guarantee that Mr. and Mrs. Customer, when they reach for the telephone, will have at their disposal the kind of apparatus needed for fast service and easy-to-hear conversation.

Service That Is Dependable

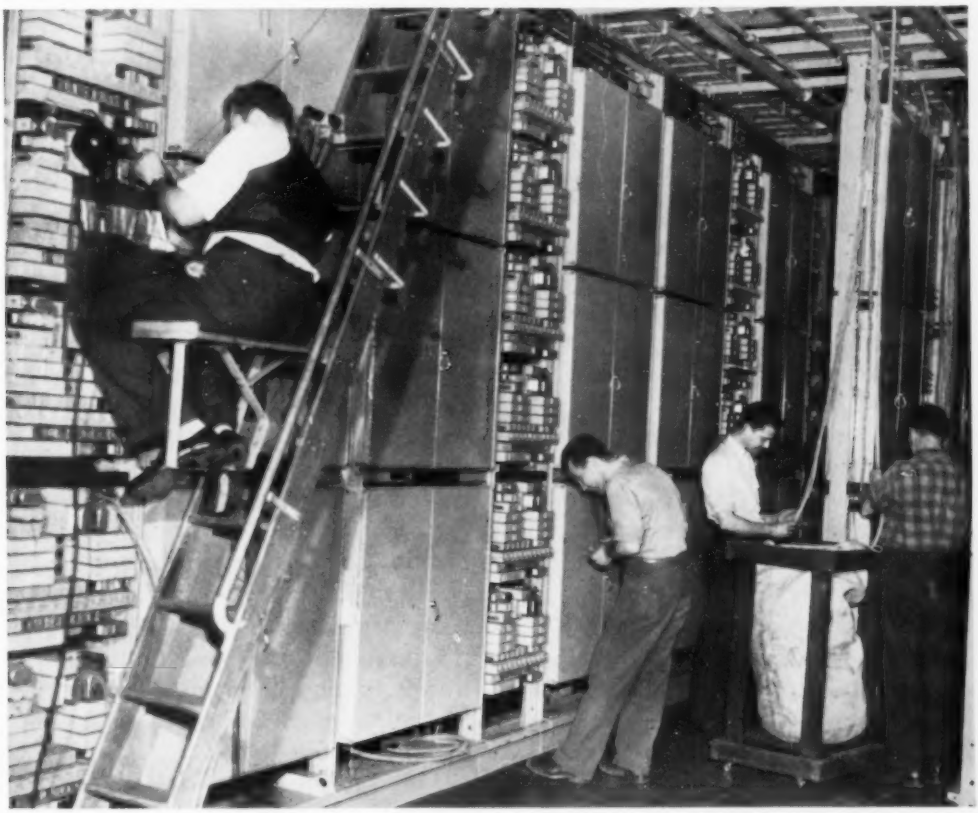
TOP-QUALITY equipment is also of the greatest importance in keeping telephone service dependable and free from interruption. In addition, Western Electric plays a vital part in maintaining and restoring service when emergencies occur. Looking back only a few years, we have had hurricanes in the East and South, devastating sleet storms from the Atlantic Coast to the Northwest, tornadoes, floods, explosions and fires in the Middle West and Southwest, floods on the Pacific Coast. In every case, the work of Western Electric in rushing equipment to the scene of action has immeasurably aided the task of restoring service.

This is partly because Western, as a unit of the Bell System, maintains a coast-to-coast warehousing and distributing organization which is set up especially to meet the day-to-day needs of the telephone companies for apparatus and materials. These nationwide stocks of supplies are invaluable when emergencies occur. So too is the fact that Western Electric equipment is standardized, and that uniform methods for installing, repairing, and operating it are known to Bell System people everywhere.

But important above all is this: The organization that delivers the equipment and the organizations that deliver the service have the same incentives and the same goal, which is to meet the needs of Mr. and Mrs. Customer as well as they possibly can. The Western Electric people who fly a plane-load of wire halfway across the country to a tornado-torn city have the same idea as the telephone men who install it—to do swiftly and surely what the needs of the service require. Trucks, tools, cable, wire, switchboards, poles, brains, arms and hands—from coast to coast—are all organized together to get the job done. It is because Western Electric and telephone people work together as partners that this is so.

Helping to Introduce Service Improvements

TELEPHONE USERS expect their service to improve as time goes along, and so it has. The art of telephony is constantly advancing. Despite the problems caused by the war, our service today is infinitely better, more extensive, more useful and more valuable than 20 or 25 years ago.



These Western Electric installers are at work on the world's largest No. 4 crossbar dial installation, in New York, which will enable long distance operators there to reach subscribers' telephones in distant places directly, without the help of other operators along the way. Operator dialing of toll and long distance calls is a major service improvement

As particular improvements are introduced, a great variety of equipment—some newer, some older—must all work together in the telephone plant. This means that the manufacturer must be set up to produce many different designs of apparatus. Most of these are made in small quantities; only a few in large quantities. To meet the Bell operating companies' needs, Western Electric turned out some 47,000 different designs in 1947, and is ready at any time to make almost as many more for replacement or repair of apparatus already in use. This is quite different from the usual mass-production set-up, though mass-production methods are of course used in making the large-quantity items.

The result is that the operating companies can take full advantage of the steady improvement in the telephone art; they can continuously and efficiently introduce new equipment that fits in and works well with the old, and can avoid making costly large-scale plant replacements ahead of the time when it is economical to do so. These economies to the telephone companies may mean a loss in business to Western Electric—for example, because fewer replacements may be needed in the future, or because more service can be rendered with relatively less equipment. But in this way, Western helps the operating companies to get the most out of technological progress, and make the maximum improvements and savings available to telephone users.

This process of change calls for a great deal of very careful coördination, and as the telephone plant becomes more complex the need for coordination increases all the time. For instance, take the work that is now being done to provide equipment for operator dialing of toll and long distance calls between New York and many other cities. At the present time work is going ahead on 94 orders for equipment in 46 central offices in the New York area alone, and on 190 more orders for equipment scheduled for installation in 98 other cities. All of this apparatus must be engineered, manufactured, and installed to meet a cutover date. To do this job, Western Electric must have, and does have, intimate knowledge of Bell System plant everywhere. And the end result, for telephone users, is better service.

Keeping the Cost to the Customer As Low as Possible

THE LAST POINT in our list was that people want their telephone service to be reasonable in cost. The relationship between Western Electric and the Bell System means that Western shares in the System policy of trying to give the best service at lowest cost. In fact, the basic reason why Western is a part of the System is to insure that the manufacturer will center on meeting the needs of the customer, rather than on doing business in the way that will be most profitable to the manufacturer. Types of equipment must be and are produced that result in operating economies to the telephone companies, and hence in economies to the user. That is the idea in a nutshell.

Western Electric's prices to the Bell System companies are substantially lower than the prices charged by other manufacturers of telephone equipment. It is interesting too that

Western's prices to Bell customers since the war have gone up much less than the rise in prices generally. In June, 1948, Western's prices on the products it makes were up on the average only 16 percent over the average price level for Western-made products in the years 1935–1939. This remarkably small increase is far less than the average rise of 75 percent in the prices of all manufactured goods. And it has been accomplished in spite of the fact that wage rates and raw material costs have greatly increased.

These facts point to the company's good faith and efficiency in carrying out a price policy that fits in with the over-all Bell System objective of good service at the lowest possible cost.

Still another test of the reasonableness of Western Electric prices is the company's profit record.

Over the years the profits have been reasonable—very reasonable.

In the entire period from 1925 through 1947, Western earnings averaged 7 percent on its net investment. This is the average of the good years, when earnings were higher, and the poorer years, when earnings were lower or losses were suffered. Compared with Western's 7 percent average, in the same period the 50 largest manufacturing companies in the country, operating in competitive markets, earned an average of 8.7 percent on net investment.

Another way to look at profits in a manufacturing and distributing business is as a percentage of total sales. During the period 1925–1947, Western's earnings were only 3.5 percent of sales, compared with 5.8 percent for the 50 largest manufacturers.

From the record, it appears that Western Electric profits have been no more than reasonable, and that the operating companies of the Bell System have obtained at reasonable prices the equipment they need to give good telephone service.

Summing Up

THIS COUNTRY does have the best telephone service in the world. One of the reasons for this is that Western Electric has so well carried out its functions and responsibilities as a part of the Bell System. Under this arrangement:

—telephone service has been provided to the greatest number of people with the greatest possible speed

—equipment of the highest quality, precision, and durability has been manufactured to uniform standards

—the reliability of telephone service has been enhanced and emergencies have been met with unusual speed

—full advantage has been taken of scientific progress in an orderly and economical way

—prices and profits of the supply company have been kept reasonable and the cost of service to the user held down.

This has all been accomplished through the operations of a manufacturing and supply organization working not toward a separate end of its own but as a unit of the System and toward the same end as the telephone companies—the satisfaction of people everywhere who use our service.

A Program to Enable Bell System Women to Discover Within Themselves Interests and Resources through Which to Enrich Their Lives Is Actively in Progress

A Design for Living

Theresa E. Boden

Health is not merely the absence of illness. Body, mind, and spirit form the whole being, and to be healthy, a person must be happy. To be happy, an individual needs some variety of interests, and it is toward discovering these that the Design for Living program is directed. Through Design for Living may be developed a more nearly self-sufficient person, free from the frustrations and emotional imbalances which, we recognize today, contribute seriously to many illnesses. We in the medical field believe that personnel activities such as Miss Boden describes are an integral and important part of a program of preventive medicine which should be our greatest contribution to the business.

MELVILLE H. MANSON, M.D.
Medical Director, A. T. & T. Co.

THE NEED for social growth of the individual, and for the achievement of personal satisfactions, is being recognized today as a fundamental element in the sum total of life's fulfillment. Some individuals reveal the need in a pattern of living which lacks zest, enthusiasm, and real happiness. Others bring their frustrations and conflicts to work with them. Some are vaguely conscious of inner resources but lack the incentive or knowledge to explore. The search is for a satisfying pattern of life.

The story of "A Design for Living—Program for Self-Development" is the story of how the Bell System has pioneered in providing opportunity for its 400,000 and more women to discover the talents and resources within themselves which enable them to get more out of life and to be successful in their relations with others.

The program consists, in skeletal outline, of a series of ten weekly meetings, at each of which a small group of ten or a dozen persons sit

Colorful publicity helps to get a Design for Living program off to a good start. The poster and the enrollment card were used in the Ohio company; the leaflets (from top to bottom) in the New York, Chesapeake & Potomac, and Michigan companies

around a conference table with a group leader and discuss a selected topic of common interest. In the process of discussion occurs the search for, and appraisal of, individual potentialities. A plan for self-development takes on additional meaning and shape with each discussion.

How enthusiastically our women have responded to this program may be gathered from some of the comments overheard throughout the System.

Says a young commercial representative: "So many ideas hatch and are buried; enthusiasms lose themselves unless there is a means of expressing them and following them up. Design for Living furnishes that

Design For Living Activity Introduced

Group Leaders who recently attended a training conference held at the Shoreham Hotel, Washington, D. C., under the direction of Miss Frances C. Greene of the American Telephone and Telegraph Company take time out to have their picture taken. These girls will introduce The Design for Living Activity in their respective departments.
Standing, left [illegible] Bess L. Murray, Washington, Dorothy A. Fiala, Washington, Hilda M. H[illegible] J. Keefe, Baltimore, Dorothy [illegible]

trained which will make it possible to take care of the large number of pending requests for enrollment when new groups are started in the fall.

In addition, group leaders will be available and anxious to assist any members who are interested in furthering their education on any of the ten topics included in the Design for Living program or related subjects.

If you are interested in this program or if you have any questions to ask, consult your supervisor.

Want to see a dream of a dress? See "To the Ladies," page 26.

The girls who were selected as Group Leaders in the "Design for Living" activity gave a tea at the close of their training conference last month. Mrs. I. E. Shaw, General Accounting, Washington, is pouring while C. W. Chaney, Accounting Personnel Assistant of the same department, looks on. Others in the group are Miss D. A. Fiala, Group Accounting, Mrs. H. M. Heasley, [illegible] Department, Charleston, W. [illegible]

The introduction of a Design for Living program is usually announced in the company magazine. This page from the Chesapeake and Potomac Telephone Companies' "Transmitter" is illustrative of that phase of publicity

means." A more exuberant business office supervisor exclaims, "Why, this is the biggest thing that ever hit the Commercial Department"; to which another group member adds, "This program not only helps the individual but also promotes better employee relationships with all departments."

An accounting supervisor said she had joined A Design for Living group because "I heard the other girls say how much these discussions had helped them to meet people more easily, and to have more confidence in themselves. It did that very thing for me. Perhaps I show no improvement as yet, but the feeling I have within is certainly a satisfaction." A ticket sorter's remark that "It has given me a new outlook on life" represents the conclusion of several hundred women who have been heard to tell what the course has done for them.

An operator plans to do more reading because she "never knew before what books meant in life," and she adds, "Now that I know how to express myself better, I'm going to be more at ease when I talk with people and I'm going to enjoy meeting people more."

And this comment from a plant clerk seems to encompass the objectives and realizations it was hoped the activity would provide: "The personal satisfactions which these discussions have left me with have opened up another world to me. Now I want to do and see and go, whereas before I just seemed to live out a routine."

An explanation of the background and objectives of Design for Living

Ways of reflecting personality through home planning and decoration have a strong appeal, as these girls of the New Jersey Bell Telephone Company make evident

will make clear why this program has been so important to these women.

How It Began

IN 1939, a small committee was set up in the Personnel Relations Department of the American Telephone and Telegraph Company in New York to consider the many requests which were coming in from telephone women in the operating companies for courses of study which would provide for effective use of leisure time. Women representatives were brought together from several of the companies in which experiments in self-development programs had already been started. What employees were searching for, this group believed, were means for discovering for themselves their real needs and interests—a continuing plan of individual self-development. To meet this desire, a program was developed for a series of discussions on topics which employee requests showed to be of common interest and value.

The Chesapeake and Potomac's attractive pamphlet "Let's Talk" describes these topics:

CONVERSATION: the art of making others feel "at home" with you.

SPEECH: how to say what you mean; the importance of choosing the right words.

READING: how to get more fun out of the time you spend with books.

APPEARANCE: how to look your loveliest; ideas for choosing hats and hair-dos; your part in the fashion picture.

ETIQUETTE: answers to your questions on the social rules.

ENTERTAINING: how to be the perfect hostess; planning parties; menus that make a hit.

HOME PLANNING AND DECORATION: color harmony, fabrics, furni-

Color harmony and its part in harmonious living are an absorbing topic for this group of Southern Bell Telephone and Telegraph Company employees

ture; ideas for fixing over your apartment or home.

MONEY MANAGEMENT: managing your money—so you don't spend more than you earn.

VACATIONS AND TRAVEL: vacation ideas; when to go and what to do with your holiday weeks and week-ends.

HOBBIES: share your favorite with others, or start something new.

Pleasing arrangement of furniture in a room is demonstrated in miniature by this discussion group of Michigan Bell Telephone Company women

It is important to note that *discussions,* not lectures or talks, provide the media for self-expression. A group leader trained in the principles of conference-method technique conducts the discussions, and sound and constructive thinking is emphasized as the group members talk over their problems and needs.

From September 1939 through October 1941, 11,000 women employees had completed the program. With the entry of the United States into the second world war, telephone women temporarily set aside their personal goals to give their free time and effort to the many war activities of those years.

Early in 1945, the program was re-introduced throughout the System. Objectives and long-range accomplishments were reconsidered in line with the Bell System's policy of offering its resources to employees for all-around development and progress. The title "A Design for Living" was selected to further the idea that within this activity might be found the key to satisfying experiences. Each participant was to complete the design according to her own needs and desires.

Money management is a matter of first importance not only to men but to many women also—including these members of the Indiana Bell Telephone Company

Good Publicity Sets the Stage

SOME COMPANY MAGAZINES publicize the start of this activity with a well-illustrated article.

Conclusion of a Design for Living program is usually the occasion for an event which offers gracious hospitality to invited guests. These hostesses for an evening are all Chesapeake and Potomac Telephone Company women

This is usually timed with glamorous cover-girl "announcement" posters for office and recreation room bulletin boards. The pink and black "Do You Have A Design for Living?" from the Michigan Bell is an example. In several instances the ideas for posters and leaflets have been suggested and developed by employees themselves.

When it is evident that the proposed program will be attractive to the employee group, the leader may meet with groups and explain the program with the aid of pocket-sized folders which list the topics to be covered. These are frequently miniatures of the poster, as in New York's "What Do You Do With Your Time?" A "Sign Me Up For Your Design For Living" enrollment card enabled Ohio Bell employees to indicate acceptance and a preference as to the time of meeting. The most recent development of this company has been the Commercial Department's slide film, "Your Time and My Time," which gives a quick preview of the course, stimulates interest, and helps to inform supervisory people. The Chesapeake and Potomac company confirms individual enrollments with a reminder card giving day, date, hour, and room number of the first discussion. This is signed by the group leader.

A Group in Action

MANY DIFFERENT TYPES and interests are represented in A Design for Living discussion group. New employees, some only a short time out of high school or college, exchange ideas with telephone "veterans."

Some are there because of their interest in one special topic. One supervisor, for instance, frankly admits she wants to improve herself and a fleeting acquaintance with Shakespeare reminds her to "mind your speech a little lest it may mar

your fortune." Conversation, speech, reading—each suggests to her the key to further study, with the other seven topics helping to round out her plan.

Other members in the group are perhaps for the first time learning that a good conversationalist is also a good listener; that the rules of conversation as practiced are not limited to social occasions but can be used to express thoughts effectively at all times.

Mending speech comes to mean exactly that to each of the twelve participants in this discussion. Each one begins to piece together, repair, and make as nearly new, whole, and perfect as possible, the speech which has been damaged by carelessness, lack of thought, or lack of knowledge. Along with the mending comes the development of poise, self-confidence, and better judgment in forming opinions. Here, too, begins the interest in continued self-development through later enrollment in English classes, and in classes in voice culture and public speaking. Dramatics and choral work subsequently help provide further stimulus for speech improvement.

Some join a group to get better acquainted with other employees and to be with people. As discussions proceed, these persons find a mutuality of interests and needs which encourages and promotes desirable relationships.

A young bride wonders if Money Management will help her with her responsibility for making ends meet for two. At the same time eleven other members of the group begin to see that the secret of wise spending is careful planning, and that family or personal budgets which help to establish financial independence also help to strengthen character and self-respect. From piggy-banks to company savings plans, the group talks over its rainy-day problems, be they of today or tomorrow.

Older employees, becoming aware of the narrow groove of living which

The qualities of leadership are fostered and developed during a two weeks' training course of discussion-group leaders. These members of the Pacific Telephone and Telegraph Company represent all that company's areas

a routine of many years' standing has established, hope to find the how and where of new interests. Each one of the group, hearing what the other is doing, what she would like to do, begins to recognize the possibilities within herself for more satisfying experience. "I haven't enough time," "It costs too much," "I don't know how to get started," are some of the stumbling blocks which a group in action help to solve.

In the discussion on hobbies, the conclusion is reached that hobbies—interests, whatever you wish to call the wise use of leisure time—mean interesting friends, the joy of creating, the satisfaction which comes from the discovery and use of abilities heretofore unrecognized: the completion of a design for living.

AND SO IT IS with each of the ten discussions. Appearance gives each group member an opportunity to relate her progress in self-development to sound standards of good taste in dress and general appearance. How to dress well on any budget acquires meaning through the additional use of attractive exhibits. Color, line, and texture are experimented with by each member—with group consensus a powerful stimulus to acceptance.

Etiquette and Entertaining suggest that a knowledge of good manners under all circumstances gives one poise and self-confidence. Consideration for others is stressed. "How should I introduce my supervisor to my mother?" "What is the correct way to interrupt a busy person?" "How can I entertain in such a small place without getting all 'fussed up'?" "When I go to the theatre, who goes down the aisle first?"

A look-in on one of the discussions, with questions of this kind coming thick and fast for group consideration, reveals how tremendously important is the need to possess social skills which help to establish what

These discussion leaders of the Bell Telephone Company of Canada have to bear in mind the French and English cultures which exist side by side in many parts of the company's territory

one group member defined as "that certain manner."

At the concluding discussion of the program—usually one covering the topic of most general interest, such as Hobbies or Vacations and Travel —guests are invited. This provides company executives with an excellent and interesting opportunity to observe at first hand just what is being accomplished with, and by, the group. A Design for Living becomes something real and not just "another course." Guests join the discussion. Plans for follow-up activities begin to take shape. A tea or informal buffet provides a final setting in which some of the newly acquired skills and graces are revealed.

Group Leadership and Individual Development

IN A MEETING of department heads of an operating company in which Design for Living has been a continuous activity since 1945, a general commercial manager expressed the opinion that the development of supervisory people might advantageously include training in and experience with group leadership in this activity. He felt that the full-time effort which a number of women in his organization had given to this work was being reflected in their attitudes, efficiency, and job relationships.

In many companies, general traffic managers have acknowledged the contribution which group leader experience has made to the total effort of developing latent ability and talent. Because of this, consideration is being given in one company to having potentially able women devote several months to full-time work as group leaders. These leaders take an average of six or more separate

When several girls who had completed the Design for Living program of the Illinois Bell Telephone Company expressed interest in Christmas gift-wrapping, group leaders obtained professional instruction and then passed along to their groups the skill they had acquired

The ten discussions which make up the Design for Living program are often extended by the members' own special interest in some one of the original topics. These culinary enthusiasts of the Bell Telephone Company of Pennsylvania were pictured during their fifth cooking lesson

groups through a complete series of discussions.

A recent comment received from a newly appointed chief operator gives further weight to the value which some women have attached to their experience as a group leader: "I am so thrilled over my promotion. I don't think I could do it if I hadn't been a group leader; for it helped me so much to know how to express myself, to use good English, and to give me the confidence you need in a big job."

During the past three years, 790 women representing twelve operating companies and all departments have received group leader training.

This training is received in a two weeks' conference conducted by an A. T. & T. Company representative, or else by a company training leader who has originally received her training from the A. T. & T. representative.

Training is concerned especially with the general principles of conference leadership, with study and practice in using the technique. It provides sufficient background information on the content of the ten topics of the program to enable the leader to stimulate and provoke worth-while discussion. It gives practice in outlining and organizing written material and lines of thought. The leader receives an introduction to the principles of the listening technique.

Since most group leaders must assume also the responsibility for local arrangements for introducing the activity to both managerial and employee groups, the training conference includes detailed information about and suggestions for publicity, planning, recruiting, and arrangements for group meetings. This requires a knowledge of lines of organization.

The use of community facilities requires an understanding of good public relations, judgment, tact, and poise; for this involves visits or other contacts with libraries, schools, adult education groups, museums, and other organizations, together with the preparation of reference material, exhibits, models, and other visual aids for use during weekly discussions. These qualities are encouraged and developed to every possible extent during the initial training of the leaders and later on through a planned program of direction and guidance.

The coördination of the work of department group leaders on a company-wide basis is usually one of the functions of the woman member of the general personnel staff.

The excellent performance and leadership of the group leaders throughout the Bell System have been a major contribution to the success of the program.

Following Through

IN THE Commercial Department program of the Ohio Bell Company this fall, for example, more than twenty new projects and topics in the company's out-of-hour activities' program are under way. They give proof of the variety of interests and needs of the women who, in a two-year period, have found through A Design for Living new meanings to life.

Their discussions on books and reading, current events, public speaking classes, book reviews, provide continuing opportunity for those who seek mental stimulation.

Other women are developing new appreciation of the arts, and their latent abilities in these arts, through extended courses in music appreciation, dramatic expression, and various group art work.

Classes in millinery, basic dressmaking, tailoring, silvermaking, leathercraft, enable them to wear beautiful and budget-minded creations of their own making and design and to augment their wardrobes with attractive accessories.

Their homes are being enriched with lovely and useful products of classes in ceramics and with a new knowledge of interior decorating. Household tips and aids and flower arranging help to give added interest and charm.

Socially, many are finding new poise and entertainment in bridge and dancing classes. For the athlete, golf, swimming, ice skating, and calesthenics provide companionship and recreation.

Many of these Ohio programs draw upon the initiative and ingenuity of the telephone women themselves in addition to making full use of community resources and facilities. An employee who had worked in a florist shop during school years conducts the class in flower arranging. Another teaches bridge; another, knitting. Outside speakers lead the discussions on book reviews and conduct the public-speaking classes. Expert private instructors teach jewelrymaking, leathercraft, and tailoring.

Last spring a highly successful minstrel show illustrated in one package the many talents represented in a Design for Living group. The artists in the group contributed colorful posters and invitations. One person with a literary bent wrote and directed the show. Another trained

the chorus. Most of the costumes were designed and created by the girls themselves. More than thirty girls participated —and they played to a full house!

Much of what is taking place in Ohio is being duplicated—with some interesting variations—in the other companies in which the program is operating.

When these girls of the Ohio Bell Telephone Company decided to carry on with lessons in dressmaking, they refused to be deterred by the fact that a Commercial office was for the time-being the only available space where they could receive instruction after business hours

In the Southern New England and New York companies, local community adult education groups and schools are coöperating by arranging special classes for telephone employees. Arrangements are made for selected subjects of interest to telephone people and at hours convenient for their attendance.

In the Illinois Bell Company, groups plan a program of adventures with food by visiting out-of-the-ordinary local restaurants, each time combining a taste treat and fun with a search for new ideas for entertaining. Food preparation and planning demonstrations have been a popular activity in the Bell of Pennsylvania.

In Michigan, group leaders, in consultation with various airlines, prepared lists of vacation suggestions and descriptive movies designed to meet a range of interests, pocketbooks, and time allowances. One result was that fifteen girls signed up for a ten-day trip to Havana at a very attractive price.

In the New Jersey Bell Company, demonstrations in hair styling and cosmetic application and fashion shows have attracted widespread interest.

In the Pacific Company, a tea and reception for a retiring executive was planned and arrangements were carried out by Design for Living groups. Three thousand people attended this party. Many compliments were received by the group for the delightful and effective way in which the affair was conducted.

The telephone women's clubs of the different state divisions of the Southern Bell Company have a multiplicity of activities. They serve as a connecting link with Design for Living by providing the channels through which most of the follow-up activities develop and operate. Among these are the choral clubs which perform with local community music groups. Study clubs draw large enrollments each season. Bazars which provide the funds for many telephone charity projects and call forth a great deal of individual

Several company libraries have integrated their activities with the Design for Living program

Background Reading

BACKGROUND READING, the 1946-47 reading course, has been planned because of the interest of many employees for the best in literature.

This is a suggested list of some of the best in various fields of good reading. They have been chosen because of their interest and readability.

Let this "cornerstone" of good reading open the door to more extensive reading of books not covered in this course because of its limited length.

Choose the books you wish to read from the following lists and check them on the back page. Tear the coupon off and drop it in the Company mail with your name and Company address and we will see that you receive the books, one at a time, as they are available.

Your Library Presents...

BACKGROUND READING

1946 • • 1947

Here are the cover (right) and introductory page (above) of a booklet of reading lists issued by the Employees' Library of the Southern New England Telephone Company

talent and ingenuity are a part of the program.

In the Bell Telephone Company of Canada, where French culture and traditions are deeply rooted alongside those of England, the Design for Living activity has presented an unusual challenge. Interest in continuing self-development has been high. One interesting project has been the preparation of a thirty-five page French bibliography with an English supplement, covering every topic discussed in the program. This was prepared by the Toronto and Montreal public libraries in coöperation with the supervising group leaders.

Three other broad developments which have received their chief stimulus from this System-wide activity have also attracted attention.

In 1947, arrangements were made for the secretaries or hobby committee chairmen of the Pioneer chapters to provide information and assistance to group leaders in the development of common hobby interests and activities.

Integration of company library facilities with the Design for Living activity has been accomplished in several companies. The librarians of the Pacific, Bell of Canada, and Southern New England companies have performed a great service to employees of these companies in helping them to develop good reading habits. In Indiana, the Indianapolis Public Library has provided the serv-

ices of a librarian who spends two days a week on company premises. The formation of small local company libraries in other parts of the System is being encouraged because of the needs of employees arising out of the self-development activity.

Several independent telephone companies have been interested in the Design for Living activity. The training in group leadership as well as the personal satisfactions arising out of group member activity have been mentioned as of particular interest. Some of the Associated Companies have coöperated with the independent companies by providing the initial training of group leaders.

A Summing Up

THE DESIGN FOR LIVING PROGRAM is growing. It is the employees' own program, designed by and for them. A true evaluation of results must recognize the weight of intangibles. Some of these are the new horizons which are being opened to many individuals whose desire for self-expression has been bogged down in what it is now fashionable to call frustration. People with interests seldom have time to be frustrated.

Poise, initiative, self-confidence, and self-assurance come from knowing the how, when, and what in varying situations. These are some of the social skills which have been fostered through group activity. Its concomitant has been a high group spirit.

Equally important has been the small but nevertheless highly significant contribution to the development of sound, constructive thinking among many individuals upon whom the leadership of the future will in all probability fall. It is trite to say that the person who understands why a thing is said is more likely to listen to what is said. This is the kind of understanding which these group discussions, regardless of topic, have helped to develop.

Since 1945, 30,000 women have sat around conference tables working out for themselves a design for living. They are of the well-rounded employee group who give day-to-day proof that these activities can add zest and richness to busy lives.

Telephone City

ALL THE BUILDINGS in the imaginary city pictured on the opposite page are Bell System buildings. What is more, they are all either new, erected since the end of the war, or buildings to which major additions have been made during that period. Each is either already completed or will be substantially completed—with one or two exceptions—by the end of this year.

There are 392 buildings in the picture. Although the city is imaginary, they are not: each represents an actual structure, and each is drawn to scale. Included are all the *major* building projects since the war; yet those represented are only one-seventh of the total number erected during that time. About 2400 smaller structures are omitted, simply because it wasn't practicable to include them all.

Types pictured include central-office buildings, toll buildings, community dial offices, radio buildings, repeater stations, office buildings, headquarters buildings. Those pictured represent $175,000,000. This is about 60 percent of the Bell System's post-war building construction program.

Method and Efficiency Are Requisites of a Task Which Constitutes the Largest Work-volume Job of the System's Revenue Accounting Forces

Sorting Two-and-a-Half Billion Tickets a Year

Fredric M. Biathrow and F. Raymond Brewster

ALMOST EVERY BUSINESS, large or small, has a problem of sorting. It may be the simple job of sorting a few hundred or thousand cancelled bank checks or drafts received with a bank statement; it may be sorting department store charge tickets; in the case of the banks themselves, it may be sorting depositors' checks and checks for clearing or transit. In the telephone business, the Bell System operating companies are confronted with the huge problem of sorting 2½ billion telephone tickets annually. While this enormous quantity of tickets does not pile up in any one place or at any one time, the job of sorting them requires currently upwards of three thousand Accounting Department clerks to spend about 5,000,000 hours annually to get the job done.

Each morning, telephone tickets written at local and toll switchboards for messages completed on the previous day are picked up according to predetermined routes and schedules by truck or messenger or are placed in the U. S. mail, and are delivered to the accounting offices, of which there are now 93, located throughout the United States and in the eastern part of Canada.

These tickets are not just slips of paper. They represent cash: over one billion dollars of it annually, which is an important part of the Bell System's annual revenue.

It is the billing of this revenue that creates the necessity for sorting the tickets into a definite order. It has been found from experience that in keeping the 26,000,000 customers' accounts for telephone service, the simplest and most economical plan is to have the records arranged in

telephone-number order separately for each central-office designation, e.g., Jonesville, Main 2, Market 3, and so on. The customers' accounts for each designation are then arranged in telephone-number sequence. The sorting problem, therefore, is to arrange the great volume of tickets received each day into the same telephone-number sequence in which the accounts are kept, in order to perform the billing in the most efficient manner.

Not only must this sorting job be done, but it must be so planned that the work will be completed and ready for further processing so that the billing clerks may complete customers' bills promptly according to scheduled bill release dates. This sorting job is the first step in a chain of operations that culminate with the mailing of the customer's toll service statement with his monthly bill. Inefficient methods or poor administration of this job could result, obviously, in the loss of many thousands of hours of time and in wasted and fatiguing effort.

In the early days of telephone history, the use of toll service was not extensive. The relatively few toll tickets required to record the out-of-town calls made could be handled without any special studies to determine the most efficient method of sorting them. But now, with the extensive use of toll service, this one operation is the largest work-volume job performed by the revenue accounting forces of the System.

Early in 1946 an intensive study was made of two methods of sorting; the so-called "desk method," used by

Desk sorting of tickets requires the handling of each ticket four times: once for each digit. The "two-handed" method is shown here

most of the System companies, and a method referred to as the "rack method," which was followed by a few of the companies—including the New England Telephone and Telegraph Company, where the rack method had been developed to the extent of producing outstanding results. As a result of this study, which included the introduction of the rack method in certain accounting offices of the New York Telephone Company for comparative tests with the desk method, the rack sorting method and technique were recommended for general use. All System companies are now using the rack method of sorting on all or part of their ticket sorting job. It is estimated that when the method is completely installed, it will have effected a reduction of 2,500,000 work hours a year—of which approximately one million has already been realized. In addition to this advantage, sorting clerks changing from the desk to the rack method generally report the rack method more interesting and less fatiguing.

The Desk-Sorting Method

IN THE EARLY 1920S the sorting of tickets began more and more to be transferred from the Traffic Department to the Accounting Department, and the concentration of this operation became an increasingly important segment of revenue accounting work.

The method of sorting followed an obvious pattern.

As a first step, certain types of tickets which reached the revenue accounting offices with two or more central-office designations intermingled required the simple sorting of the tickets into the different designations.

The next step was the numerical sorting for each central office; and, since telephone numbers consist of not more than four digits (with minor exceptions) and a party-line letter (where used), the successive steps in the numerical sorting were to sort the tickets separately for each of the four digits beginning at the left, that is, by thousands, hundreds, tens, and units. This was accomplished on an ordinary desk or table by holding in the left hand a small portion of the unsorted tickets and picking them off one by one with the right hand and placing them on the desk or table in a double row of five piles, one pile for each thousand digit.

Thus, when the unsorted tickets had been so processed according to the first left-hand digit, they were in order by thousands. These ten piles were then laid aside and the tickets for each thousand digit were then similarly sorted by hundreds. Each of these hundred digit packs was then sorted by tens and each of the ten digit packs by units. By sorting the tickets successively according to the digits from left to right, they became sorted into complete numerical sequence.

The complete numerical sorting process required not only handling most of the tickets four separate times, but also considerable picking up of the ten piles in each of the separate sortings and, where the tickets for a given central office were voluminous, a constant straightening of the piles to prevent them from tipping and becoming disarranged.

Under a later variation of the desk method of sorting, a pack of unsorted

Since each rack has 100 numbered pockets, the tickets need to be sorted only twice: by the last two digits and then by the first two

tickets was placed on the desk directly in front of the clerk, who, using her hands alternately, picked the tickets from the unsorted pack and placed them in ten piles arranged around the unsorted tickets and as close as practicable, to avoid an unduly long reach. This process was repeated for each of the four digits, as previously described. It, too, required the handling of the tickets four separate times, but it utilized both hands rather than only one hand in getting the tickets from the unsorted pack to the proper numerical pile.

This so-called "two-handed" sorting operation looks complicated at times, since it involves some cross-hand movement when, for example, the left hand is moving to the extreme right to place a ticket on the "9" pile while the right hand is picking up a ticket and starting it toward the extreme left to place it on the "0" pile.

The Rack-Sorting Method

THE NEXT IMPROVEMENT in sorting methods was made by the Chesapeake and Potomac Telephone Companies, and involved the development and use of a rack to aid in the sorting. They also developed a sequence of sorting operations which is described later. The original rack was made by a local tinsmith and, while a number of refinements have been made in construction, the present-day rack is fundamentally the same as the original.

The rack is comprised of two cabinets, hung on either side of a stand. Each cabinet consists of two 50-pocket sorting sections, and one 10-compartment section located above the top row of sorting pockets and

An instructor emphasizes the importance of holding the unsorted tickets in the correct position in the hand

used to store tickets awaiting sorting and for overflow from individual pockets. The lower section of each cabinet can be closed and latched against the upper section, thereby providing an orderly and reasonably safe method of temporarily storing tickets prior to their removal from the rack after the completion of the sorting operation. The sorting sections, combined, have ten vertical and ten horizontal rows of pockets. The vertical rows are numbered across the top from left to right, beginning with zero. The horizontal rows are numbered up the sides and center of the cabinet, the lowest numbers being assigned to the bottom row. Thus a sorting pocket is provided for each of the one hundred two-digit combinations "00" to "99."

For a considerable period after the first racks were put into use, the technique of sorting followed the hand movement pattern of the desk-sorting method first described. A pack of unsorted tickets was held in the left hand while the right hand picked them off one at a time and placed them in the proper sorting pocket. This involved considerable hand travel, and also a constant shifting of the eyes between the unsorted tickets and the rack pockets.

A study of this operation, based on practices developed by the New England Company, showed that a substantial saving in time and a considerable lessening of eye strain and fatigue had been accomplished by having the two hands move in unison; the left hand holding the unsorted tickets and the right hand picking off the tickets and, with only a short movement, placing them in the proper pockets.

The first step in the rack sorting operation is performed by referring to the last two digits of the telephone number, commonly referred to as the "right-hand sorting number." The sorting clerks soon become adept in locating the rack pocket corresponding to the right-hand sorting number and in rhythmically moving from one pocket to another, accomplishing the sorting with considerable rapidity.

After all tickets for a given sort-

ing assignment have been placed in the rack pockets in the manner described, they are then removed in reverse sequence order, i.e., "99" to "00," and then sorted according to the two left-hand digits, referred to as the "left-hand sorting number." By beginning the left-hand sort with the tickets in this arrangement and proceeding in descending sequence to the double zero, the tickets, when removed from the pockets after the completion of the left-hand sort, are in complete numerical sequence. The tickets are, as a consequence, sorted into complete telephone number order with only two handlings, as contrasted with the four handlings under the desk method.

Proudly on her own! A new sorting clerk puts into practice her lessons on proper position of the hands

Sorting for Billing Periods

THUS FAR we have described the sorting operation as it would be performed if the tickets for a single day's business were sorted into complete numerical sequence. However, it is not economical to complete the sorting of tickets for each individual day's business. That is because such an arrangement would require several rehandlings of all tickets, in a series of special assembling operations, to bring together in chronological order for a full billing period all tickets for each telephone number.

Under the rack method, such special assembling work is entirely avoided for most central offices. This is done by sorting each day's tickets for a full billing period into the same racks according to the right-hand sorting number only. When the last date in the billing period has been sorted, the tickets for the earliest date are at the bottom in each pocket. The regular secondary sorting of these tickets according to the left-hand sorting number then produces directly the required numerical and chronological arrangement of the tickets for the full billing period, the earliest date being at the top, as it should be for billing purposes.

For the larger central offices, where the volume of tickets may be too great to warrant deferring the sorting by the left-hand sorting number until the end of the billing pe-

This photograph of the set used in shooting the motion picture "Sorting Toll Tickets" illustrates what goes on behind the scenes to counterfeit reality. The three pictures on pages 167, 168, and 169 are from this "movie," while the first picture (page 165) is from "An Orchid for Peggy"

riod, some intermediate sorting by the left-hand sorting number may be required—in which case some special assembling work would be necessary. The rack method does, nonetheless, reduce substantially the number of times the tickets are handled, not only because of the sorting of two digits at a time but because of the elimination or reduction of the amount of special assembling time involved.

Instruction through Motion Picture

THE SUCCESS of the racks is due not only to the device itself but in large degree to the use of the proper technique in the handling of the tickets.

It was first thought that this technique could be described in writing with sufficient effectiveness to permit instructors to teach it successfully to sorting students. It soon developed, however, that this could not be satisfactorily achieved by depending on text alone to convey the exact manner of handling the tickets.

Even though classes for supervisors and staff people were held with instruction from people skilled in the technique, it became evident that the process of transmitting this skill to the several thousand clerks required

for this work, and to the added thousands who would be employed over the months to replace those who resigned or were promoted, would unduly defer the realization of the important economies that could be effected. It would also be difficult to preserve the exact technique over a period of time because of changes in supervisory personnel.

Methods people in the A. T. & T. Comptroller's Department had already had experience with sound-motion pictures in meeting other technical training problems, and it was decided to produce a picture which would provide demonstration by skilled sorting people. As a result, a training picture entitled "Sorting Toll Tickets" was produced with the assistance of the Film and Display Division of the A. T. & T. Information Department and was distributed to all Bell System companies. This picture provides expert effective visual aid for instructors' use in the accounting offices. An Instructor's Guide was issued with the picture as an integral part of the training program to assist instructors in the use of the film. Also, a set of 12 still pictures illustrating the key points in the sorting technique was prepared as an additional visual aid during training and to assist supervisors in correcting any sorting faults which might subsequently develop. The motion picture has proved successful in providing the offices with uniform expert instruction and demonstration of the precise technique which will produce the best results.

Motion pictures produced with other objectives have been found useful also in providing demonstration of the performance of various operations. The Accounting Department film "An Orchid for Peggy" included several scenes in which the two-handed method of sorting tickets was clearly demonstrated—although the purpose of the picture was primarily to show the accounting clerks, especially those of short service, through the medium of a story treatment the importance of clerical assignments, such as ticket sorting, in the over-all job of giving telephone service. Another Accounting Department picture, "The Truth About Angela Jones," now in production, while designed to bring out the need for clerks to do a quality job and to accept the quality standards expected by the public, will include a sequence built around rack sorting and will incidentally show clearly the technique of this method.

FUTURE DEVELOPMENTS may bring about changes in toll operations and in the recording of toll calls. Nevertheless, as already stated, the present requirements are that 2½ billion tickets a year must be sorted numerically and chronologically. This is in fact a stupendous job. Intensive study has resulted in a substantial saving in time and in making the operation more interesting to the personnel, and it may be found by continued study of the sorting processes that still further advances can be made.

The Bell System's Motor Vehicle Safety Program Aims to Eliminate Personal Injuries and Make More Efficient the Transportation of Men, Tools, and Materials

Promoting Safety in Our Automotive Fleet

Erle S. Miner

THE PROBLEM of fostering safe driving has become increasingly important in the Bell System with the growth in traffic on the nation's streets and highways and in the number of telephone company motor vehicles.

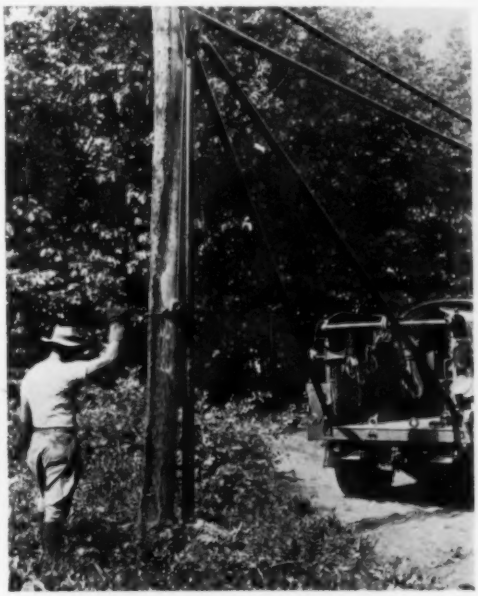
The Bell System automotive fleet is the largest fleet of commercial vehicles in the world. These cars, trucks, and miscellaneous rolling stock cover some 600,000,000 miles a year. Traveling the normal distance apart on the highway, they would make a continuous procession across the country from coast to coast.

It is no wonder, then, that the operators of telephone company vehicles who begin each day's work by driving onto the streets, roads, and highways from company garages located in towns and cities throughout the country recognize that they play an important part in demonstrating safe and courteous driving. It is a tribute to the sincere efforts of these employees, resolved to drive each mile during each day alert to the hazards of both vehicular and pedestrian travel, that their success has been demonstrated over and over again by excellent safety records.

One widespread idea that has made the prevention of accidents unnecessarily difficult is the groundless belief that motor vehicle accidents are the inevitable price we have to pay for technological progress in transportation. Experience has proved that such accidents are preventable, and can be decreased by intelligent planning—just as in other fields.

As is generally known, organized fact collecting, analysis, planning, and practical application of findings have made possible real progress in general accident reduction in the Bell System. The same approach is being applied to assure safe operation of the Bell System fleet.

The Old Way . . .



and the New

Modern power equipment makes the telephone job less arduous, more efficient . . . and safer

The features which comprise such a comprehensive safety program include:

(1) Improved selection, training, and supervision of drivers, and the maintenance of their interest and good attitude;
(2) proper care of the vehicles through modern maintenance methods, and;
(3) design of motor vehicles and equipment to best meet the needs of the business.

Selection of Drivers

THE FLEET consists of half-ton trucks, of which the installation type is representative; other trucks, ranging in size from three-quarter-ton load capacity up to 5- and even 10-ton capacity; and passenger cars for supervisors in the field. There are, in addition, trailers, pole-hole diggers, pole derricks, platform ladder trucks, tractors, bulldozers, air compressors, trenching machines, various kinds of wire and cable plows, and other miscellaneous types of vehicles. All these require operators trained and always alert to assure their safe and efficient operation.

Most of the trucks and cars making up the Bell System fleet have for their main purpose the transportation of men, tools, and materials; and, in many cases, the provision also of power-operated devices for work on the job. Thus the employees who drive vehicles generally do so as only a part, but a very important part, of their regular telephone jobs.

These employees are selected on the basis of being physically and mentally qualified after training to

Bad weather creates hazardous driving conditions, which require watchful driving to overcome. Note the crew compartment behind the cab of this construction truck

perform safely all the telephone tasks to which they will be assigned. The amount of driving each day by the many drivers necessarily varies widely with geographic conditions, job locations, and types of work. Nevertheless, special emphasis is placed on selecting employees who possess proper physical and mental qualifications and attitudes for developing into satisfactory drivers.

Physical examinations of new employees who are to drive cars generally devote special attention to eyesight, hearing, heart and blood-pressure tests. Then initial road tests are usually given to help determine individual training requirements.

In several companies, it has been found desirable to give drivers periodic physical examinations and road tests. Neither initial nor periodical examinations and tests given have been found to be a "cure-all" for motor vehicle accidents; their primary purpose is to enable individuals to improve themselves as drivers by compensating for any weaknesses, not to deprive them of the privilege of driving. Also, periodic testing of drivers calls to their attention physical defects which may be corrected, and, furthermore, heightens their interest in careful driving.

The relatively few chauffeurs and drivers of the longer-mileage supply and delivery trucks are usually given more rigid physical examinations than the drivers who operate vehicles shorter mileages as a part

of their regular jobs. Yet all examinations and road tests must be sufficiently thorough to measure the individual's driving knowledge, skills, and attitudes, so that training and remedial measures may be initiated to offset any weaknesses revealed. The same general procedure which has been found to be essential in determining the training needs of employees who are to become cable splicers, linemen, installers, switchmen, and other craftsmen, applies in the same way to finding out training requirements of the operators of the automotive fleet.

Training Motor Vehicle Drivers

THE MOST IMPORTANT PART of the fleet safety program, strongly justified from humanitarian and economic points of view, is that of training. The need for training in safety is never ending. It begins when the employee enters the business, and should continue, as required, to the day he leaves the service.

The method of training employees to drive company vehicles is usually governed by the number employed at one time in a particular location. In cities where centralized schools can be organized, new drivers receive the benefit of classroom instruction in addition to road tests and supplementary training under actual operating situations. Under other conditions, all road tests and necessary training are given by supervisors or other qualified personnel. Many of

Thorough inspection and maintenance of motor vehicles, in company garages from coast to coast, have a major share in the Bell System's safety program

the latter have completed supervisory training courses on safe driving established at over 30 colleges and universities.

The complete training of drivers is one of the major responsibilities of the supervisor. He must know what is taught at the Company schools; he must be familiar with each man's ability, attitude, and habits as a driver; and he must see that the training is done effectively if the safety program is to be successful.

It is common practice to give "refresher" courses on a periodic basis, and seasonal reminders—being particularly careful of children going to school and at play, and alert to winter driving hazards. Again, the method of giving this training depends upon the number of employees at a particular location. A usual method is to provide a suitable classroom and make full use of discussion and visual aids. Many excellent sound motion pictures and strip films are available and have been used extensively. So have model demonstration boards with miniature trucks and cars which portray in a realistic manner the causes of accidents and their prevention. Other training media include blackboard illustrations, charts and diagrams, bulletin boards, posters, company magazines, monthly accident reports, and safety meetings.

The tough part of the motor vehicle safety problem is that driving smoothly and safely for a block, for a mile, a day, a month, a year is not enough. Each driver must practice continuously *the highest type of self control, must keep alert, must adjust his driving to meet traffic, road, and weather conditions.*

Not only is it necessary to be sure that regular operators of the vehicles are fully trained, but the substitute drivers and the engineers and other employees who drive cars occasionally must also be safe, courteous, and efficient. It is also necessary to train construction forces in the safe operation of all the auxiliary motor and power equipment—derricks, winches, cable plows, trailers, pole-hole diggers, tractors, trenching machines, and others—enumerated previously.

All this training of 75,000 regular and occasional Bell System drivers has further safety value, since it enables them to operate their own cars properly when off the job and thus add to the over-all safety on the streets, roads, and highways of the nation.

It has been said that a supervisor must be first of all a teacher. This includes not merely initial instruction but "follow-up"—maintaining the employee's interest and correct attitude and many other things necessary to get results. The importance of this is illustrated by one As-

More than 60 percent of the System's motor vehicles are half-ton trucks, of which the installation type is representative

sociated Company division that made a remarkable reduction in accidents after the foremen and other supervisors had been with their drivers on the road for a sufficient time to observe the driving skills and habits of their men and had then retrained them as required. This was a real application of the Bell System "Safety Observation Plan," * which has for its purpose the detection of unsafe practices and their correction before accidents occur.

While the success of any safety program is usually a reflection of the interest maintained by management in the prevention of accidents, it is, after all, the first line supervisor or foreman with whom the employee comes in daily contact. It is the foreman who is actively engaged in directing the operations on the job and it is, therefore, necessary that he be properly trained to fulfill his obligations of seeing that his men drive safely. The types of supervisory training which are helpful to the foremen in this endeavor include: Vocational Instructor Training, designed to teach the foreman how to teach; Human Relations Course; and Job Planning.

* See "The Bell System's Safety Observation Plan," MAGAZINE, Summer 1944.

Creating Driver Interest

AN EMPLOYEE may possess the necessary skills and knowledge for safe driving and yet be involved in accidents unless he has the proper attitude and always keeps his mind on his driving when operating his vehicle.

The Bell System companies are using many methods to create and maintain interest and develop the

Plowing-in telephone cable presents potential hazards which call for careful planning of the project and equally careful training in the necessary precautions

proper attitudes for safe driving. In addition to the means already mentioned, a number of other projects in the fleet safety programs are designed primarily to create and maintain the interest and correct attitude of drivers.

Safe Driver Award Plans

The companies have found such plans to be of value in stimulating and maintaining drivers' interest in safety. They vary somewhat in kind and method of presentation. A usual procedure is to present at suitable annual meetings card certificates showing the number of years the employee has operated a car without an accident. Sometimes it has been found possible to have the State Commissioner of Motor Vehicles or some other state or city official present upon such an occasion. Photographs of these meetings and further recognition to the outstanding drivers often appear in the company magazines and safety publications.

Hundred-thousand-Mile Clubs

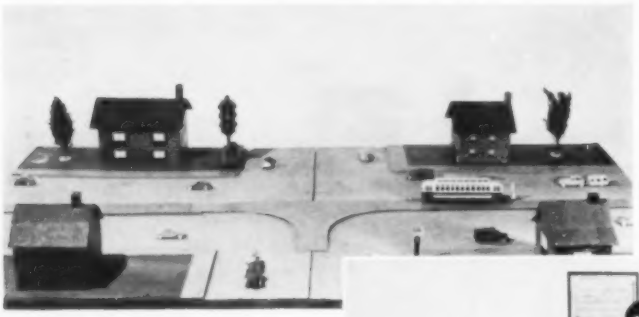
In addition to cards, special recognition is given to drivers who have operated their vehicles ten years (about 100,000 miles) without an accident. The awards are presented by officials of the company at annual meetings attended by the drivers or even all the employees in a district. Upon the completion of fifteen or twenty years' safe driving, employees may be given further recognition.

Safety Contests

In this activity the accident summaries are used to engender friendly competition and rivalry between districts and Areas. Suitable plaques and awards are presented to the winners.

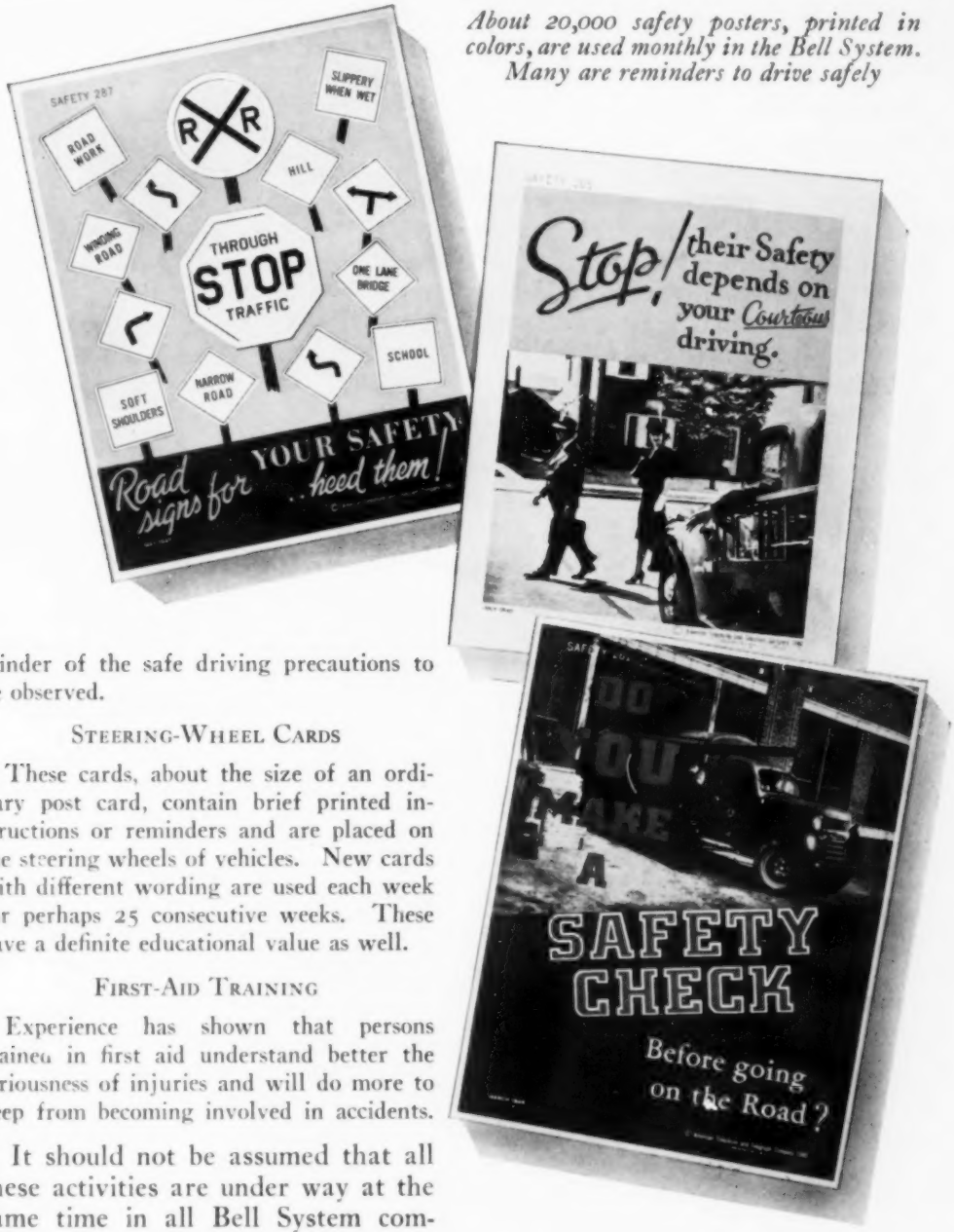
Driver's Resolutions

Employees in some companies are given opportunity to sign cards containing a resolution to drive safely both on and off the job during the coming year. The cards are kept by the employees and serve as a re-



How accidents happen, and how they can be avoided, are shown on demonstration boards with miniature vehicles

Vehicles on the board at the right are maneuvered by means of electrical controls



About 20,000 safety posters, printed in colors, are used monthly in the Bell System. Many are reminders to drive safely

minder of the safe driving precautions to be observed.

Steering-Wheel Cards

These cards, about the size of an ordinary post card, contain brief printed instructions or reminders and are placed on the steering wheels of vehicles. New cards with different wording are used each week for perhaps 25 consecutive weeks. These have a definite educational value as well.

First-Aid Training

Experience has shown that persons trained in first aid understand better the seriousness of injuries and will do more to keep from becoming involved in accidents.

It should not be assumed that all these activities are under way at the same time in all Bell System companies. It is recognized that any employee stimulation which becomes monotonous loses its appeal. For this reason certain projects may be discontinued and others introduced in the effort at all times to do things which seem to be most successful in developing smooth, courteous, efficient drivers, always mindful of the rights of pedestrians and other motorists.

Motor Vehicle Accident Data and Their Use

ALL KINDS OF RECORDS are needed in the Bell System for efficient operation. In order to determine the effectiveness of the motor vehicle safety activities, accident reports are carefully recorded and summarized. The summaries are compared with the results for other periods, and any trends which are developing are noted. Thus information is provided for the purpose of showing where special attention might most profitably be applied.

This information—the facts behind the accidents—may indicate a need for change in design of equipment; change in practices; or the introduction of special training to correct unsafe acts or driving habits —speeding, following too closely, lack of concentration.

Accident reports and records are not an end in themselves. They are valuable if used to determine the progress being made, conditions and driving practices which cause accidents, remedial measure to be introduced to correct adverse trends: in general, the basis for a sound motor vehicle accident prevention program.

It is essential that drivers appreciate the need for traffic laws as necessary to both the movement of traffic and the prevention of accidents. Bell System drivers do understand this; and, furthermore, they know that drivers who disregard the rights of others must be restrained from doing so, and in extreme cases denied the privilege of driving if they persist in the practice. This makes for an appreciation of the need for efficient law enforcement and for measures which are aimed at saving life and property through the prevention of accidents to other motorists and pedestrians.

To help this realization, the telephone companies furnish their employees an illustrated booklet containing the city and state driving regulations, operating practices, or rules for safe driving and procedures to follow in reporting accidents if they occur. Operating practices covered in the booklets are exemplified by the following:

Traffic signs and lights
Traffic lanes
Intersections
Following too close
Weather conditions
Fog, snow, sleet and rain
Pedestrians—children
Parking
Inattention
Taking chances
Right and left turns
Passing
Use of horn
Hand signals
Speeding
School buses and trolleys

These efforts have resulted in splendid coöperation between Bell System drivers and city and highway police. Evidence of this is the attendance of city and state police officers at safety award meetings and their commendations given for the courteous operation of telephone company cars. Bell System employees are often called upon, in turn, to give police organizations the benefit of Bell System first aid training and safety experience, and often receive favorable publicity in the newspapers for safe driving.

Modern Maintenance Methods Promote Safety

IN NO OTHER field of accident prevention is it so evident that the inefficiencies which cause accidents are the same as those which lead to other production losses.

A trailer equipped with motion-picture projector and screen and with other display items takes classroom safety training to men on the job in remote locations

Above: Inside the trailer, men compare pictures of the unsafe and safe methods of performing a task. Right: The mobile training unit reaches a construction crew out in the great open spaces

Experience has definitely proven that safety and efficiency go hand in hand. This seems particularly true in providing adequately maintained motor vehicle equipment that is safe for employees to operate on the streets, roads, and highways, through all kinds of traffic and varying weather conditions.

Preventive maintenance assures that vehicles will be able to get safely to their destinations and not be held up for emergency repairs, reduces to a minimum the possibility of accidents caused by mechanical failures, and maintains the condition and appearance of the vehicles so that drivers will be proud of their vehicle.

Bell System companies have long recognized the value of properly maintained garages. A clean, orderly, good-looking garage, stock room, and storage yard reduce the possibility of accidents to the garage forces and to motor vehicle drivers while entering or leaving the garage or yard. A properly maintained garage can be an incentive for drivers to keep their cars, tools, and equipment in good condition and to drive and work safely during the day.

Drivers are trained to understand the fundamentals of mechanical construction and operation of their vehicle and equipment, and the value of preventive maintenance. The value of checking steering, brakes, horn, lights, tires, and windshield wipers before leaving the garage each morning and reporting each defect at the end of the day's work are included in the training. This is because almost all motor vehicle failure is progressive, and many of the troubles

which lead to eventual breakdown can be discovered and reported by the driver. This is another way of preventing accidents before they happen.

Fitting Motor Vehicles for the Work To Be Done

MOTOR VEHICLE EQUIPMENT, like telephones and switchboards and all the other types of telephone plant, is constantly being improved to meet the particular needs of the service.

In this evolutionary process, one of the main features always given consideration by Bell System automotive engineers is to build safety into design and use of the equipment.

In addition to making equipment safe to use and the work less burdensome, it is designed with the comfort and convenience of the employees in mind. Examples include the development of the crew compartment on trucks behind the regular three man cab, space for storage of lunch boxes, heaters (when necessary), and drinking water coolers.

In the use of motor vehicles and the many kinds of construction apparatus, employees are encouraged to observe and report upon operating practices and upon design features of the equipment which can be improved from the standpoint of safety or efficiency.

Improved and modern automotive equipment has done much over a period of years to make telephone work less burdensome as well as safer. This is the natural result of placing special emphasis on all mechanical devices which will save time and promote efficiency. A few outstanding examples illustrate the modern method of utilizing automotive power equipment rather than hand power: digging holes with pole-hole diggers; handling, setting, and moving poles with power winches and derricks; us-

A 100,000-Mile-Club dinner. The 12 men in the foreground have driven 20 years each without an accident

Awards and certificates are presented to employees who have established outstanding records for safe driving

ing power reels for taking down wire and removing cable; and using pole and cable-reel trailers. The use of power winches for lifting heavy loads, pulling in and removing aerial and underground cable, and many other operations has lightened burdens and made telephone work easier, safer and more efficient.

Printed instructions covering the methods of using automotive equipment and construction apparatus include safety precautions. The cable splicer working with a truck equipped with a platform ladder would have a practice covering the raising and lowering of the ladder. This practice contains such statements as:

"Before erecting the ladder, be sure to learn and understand all the safety and general precautions involved."

". . . make sure that any signals are thoroughly understood by all persons concerned."

"Immediately after entering the platform, attach both safety chains to the D rings of your body belt."

IN THE FINAL ANALYSIS, the success of the motor vehicle accident program rests in the hands of the 75,000 regular and occasional operators of the motor vehicle equipment. That is the reason safety programs are designed to utilize every possible educational method to develop in each driver an understanding of the approved techniques of skillful driving, as well as a feeling of his responsibilities to himself, his organization, the pedestrian, and other users of the highway.

That this approach has been successful is evidenced by the number of times that telephone company employees who operate motor vehicles have won high honors when they have competed with other fleets op-

The National Safety Council reports 32,300 persons killed last year and 100,000 left with some permanent impairment, due to motor vehicle accidents in the United States. The estimated property damage was $1,100,000,000, plus an additional cost of $1,550,000,000 for medical expenses, overhead costs, and value of services lost to the nation because of these motor vehicle accidents during the year.

erating in the same city or locality. The good safety record of Bell System drivers as a whole parallels the fine safety record of the employees of the entire communications industry shown each year in figures published by the National Safety Council. These figures continue to show that the communications industry has the best accident record in American industry.

Although the employees in the telephone companies are justly proud of their safety records, it is recognized that the problem is a never ending one. The general traffic conditions probably will not improve very rapidly as more vehicles fill the highways. With this there will be new drivers coming into the business, and new types and designs of motor vehicles and power equipment requiring special training and attention. Telephone service is essential in rain, sleet or sunshine. The fleet of well kept Bell System cars will be on the road in all kinds of weather. Each driver, trying to be courteous and careful, knows that an extra measure of caution and concentration goes a long way in preventing accidents.

While the purpose of organized safety is primarily to *prevent* suffering, heartaches, and financial losses to employees, their families, and others, a good record demonstrates that steps have also been taken to improve public relations, reduce costs, and otherwise increase the efficiency of operations.

It makes sense—because by doing things the safe way all are gainers.

This creed is standard equipment on the instrument panel of every Bell System motor vehicle

Mechanical Prevention and Legal Penalties Deter the Minority Who Seek to Defraud the Telephone Companies For Services Rendered at Coin Telephones

Most People Are Honest

H. Montague Pope

IT WAS in the year 1889 that the first public coin telephone was installed, in Hartford, Connecticut, on the ground floor of the old Hartford Bank, at the corner of Main Street and Central Row. Other public coin telephones soon were installed in Connecticut, and were gradually introduced in other sections of the country.

The telephone industry in those early days was a fast-growing one—as, in fact, it still is—and with the installation of the ever increasing number of telephones in homes and business concerns, the need for public telephones became increasingly important. Compared with that first public coin telephone, installed in 1889, there are now in service in this country nearly 720,000 Bell System public and semi-public multi-slot coin telephones, and more than 3,000 attended public telephones. In addition, independent telephone companies have about 75,000 public telephones in service. In 1947, public telephones produced approximately $200,000,000 in revenue.*

Coin telephones have tempted some people to beat the telephone companies out of legitimate charges for the services they furnish, through the use of slugs in lieu of United States nickels, dimes, and quarters. Over the years, the use of slugs had become increasingly prevalent, until Bell System losses reached a peak in 1933.

It was a serious problem for the telephone companies, for it was apparent that losses would continue to increase unless decisive efforts were made to combat the fraudulent use of slugs. The situation was canvassed, and consideration was given to such steps as designing new coin telephones, modifying existing coin telephones, attacking the sources of slugs, seeking the enactment of State laws or the strengthening of existing laws, and invoking existing Federal laws.

The improvement of coin telephones is, like the improvement of all items of telephone equipment, a

* See "Public Telephones," QUARTERLY, October 1939; and "Public Telephones: They Serve Everybody," MAGAZINE, Spring 1948.

The Gray Telephone Pay Station Company's first coin telephone apparatus—minus transmitter and receiver, but with a support for the left elbow. The year was 1889

matter for continuing study. The decision was, therefore, as a first step, to alter and refine the arrangements in present coin telephones for detecting and rejecting slugs.

The metal box housing the coin collection and rejection features of the public telephone has been kept as small as possible, and there are, therefore, some limitations as to what modifications can be made in the existing telephones. Bell System coin telephones have been made by Western Electric Company since 1934, and engineers of American Telephone and Telegraph Company, Bell Telephone Laboratories, and Western Electric Company have cooperated in introducing new features in the coin rejecting mechanism to the extent possible in the space available. These new features have been principally two.

The coin gauges at the top of the coin box were formerly of nickel-plated brass, while the new gauges are of steel and made to more exact specifications, with limits closer to the sizes of coins. This prevents the use of over-sized slugs, and minimizes the wear on the gauges. The coin-chute runways through which the coins pass are now made to more rigid specifications, thus increasing the efficiency of the rejecting features of the mechanisms and making them less subject than formerly to deformation through wear.

Drying Up the Sources of Slugs

A DIFFERENT ATTACK was upon the supply of slugs that could be used instead of 5¢, 10¢ and 25¢ United States coins.

One of the first steps was to determine the sources of slugs and to take such action as seemed appropriate to reduce the supply to a minimum.

Many manufacturers of marking devices made trade checks, tokens, key tags, and similar innocent items in sizes approximating the sizes of nickels, dimes, and quarters; and many of them soon found their way, through fraudulent use, into coin telephones. In the early 1930s the national trade association of the industry was approached and, when informed of the fraudulent use of members' products, heartily coöperated with the Bell System. At an annual meeting of members, the group unanimously agreed not to make such

products in sizes susceptible of misuse.

Not long thereafter, certain members were requested to quote prices on coin-size slugs in orders as large as one-ton lots. To their great credit, these members replied that no member of their association would be a party to business of such a questionable nature.

Another problem arose when legitimate manufacturers found it necessary, in the course of making their products, to create waste punchings of metal which sometimes were of coin sizes. In some instances these punchings found their way into coin telephones. The managements of these factories, when informed of what was happening, immediately took steps to keep the punchings from leaving the factories. Occasionally it was difficult to determine the source of the punchings, but vigilance on the part of telephone employees usually resulted in its discovery and elimination.

THERE HAVE BEEN many instances of business concerns distributing advertising discs of coin size—some of which have subsequently been found in coin telephones. Manufacturers and distributors were interviewed, and when informed that the slugs were being used fraudulently, agreed to destroy their supplies of such discs and cancel pending orders for additional slugs. One interesting case was a religious organization which distributed 25-cent-size discs having a brief prayer on each side. When informed of the misuse of these "prayer slugs," the organization immediately canceled all orders for additional discs.

Because of the coöperation of legitimate manufacturers, slugs eventually became scarce. This apparently suggested a lucrative field to certain individuals and concerns, who thereupon went into the slug manufacturing business in a big way. Some of them had in their factories various types of coin-operated merchandising machines, including coin telephones, presumably to enable them to design slugs which these machines could not reject. An idea of the character of these concerns may be obtained from the following excerpt from an advertisement of one of them:

"We are the leading supply house for slot machine slugs. These are

A later Gray model, with coin slot in the big bell, above the initials of the Southern New England Telephone Company

sold for use only in gambling devices. . . . They work just like real money, oftentimes better. When money has become worn it sometimes will fail to work the machine. Our slugs never fail. . . . These slugs are not sold to be used in telephones or other legal machines."

The last sentence of the quotation was in large print, and in effect actually informed people that the slugs could be used to operate telephones or other legal machines.

THERE WAS IN 1933, due probably to general economic conditions, a definite increase in slug usage not only in telephones but in coin-operated merchandising machines, postage stamp machines, railway turnstiles, automats, and similar devices; and the operators of coin collecting devices were determined to combat this fraudulent use.

This Gray instrument had not only an elbow rest but slots for half-dollars and "cartwheel" silver dollars as well as for the usual smaller coins

The Bell telephone companies intensified their efforts to reduce the use of slugs. Analyses were made to determine periodically the extent of use at each coin telephone, and slugs were classified by types. As new types of slug showed up, their source was usually discovered—although that was often not easy to find.

Where the use of slugs in a given coin telephone was heavy, the agent on whose premises it was located was interviewed and the situation was explained to him—including the effect of such fraudulent use in reducing his commissions. The agents coöperated with the telephone companies on the side of law and order, and sometimes were able to point out probable suspects. Their assistance resulted in a number of arrests by city police, followed by convictions in the courts, and the newspaper accounts of the convictions unquestionably contributed to the reduction of slug usage. In some situations where all efforts failed to reduce the use of slugs, the coin telephones were removed and reestablished in other locations. During the last war, oddly enough, the shortage of metal increased the difficulty of slug makers, and as a consequence contributed to the reduction of slugs.

There is one case on record where the user of slugs in a coin telephone was apprehended through the use of finger-prints. In this instance a long distance call of several hundred miles

was made; and immediately after the call the plain brass slugs used were removed by city police and taken to headquarters, where they were photographed and the finger-prints identified. The user of the slugs and his associate were quickly arrested, and were later released after each had put up $1,000 bond. The two men forfeited their $2,000, and their automobile was confiscated by the police, since it contained a sack full of brass slugs similar to those used in making the long distance call. Crime does not pay!

A modern coin telephone

Laws and Law-breakers

By 1933, the majority of states had enacted laws to prohibit the use of slugs and penalize the users; but few statutes prohibited the manufacture, sale, or distribution of slugs.

Soon thereafter, several states enacted laws to prohibit the manufacture, sale, or distribution of slugs with fraudulent intent, or with knowledge or reason to believe that such slugs were for fraudulent use. Except in a few cases, these state laws were not very effective, for the reason that it was too difficult for a district attorney to prove fraudulent intent. The manufacturer or distributor could always proclaim his innocence and deny any attempt to defraud.

While amendments to Minnesota and Ohio statutes were being considered by the state legislatures, a suggestion was made that the amendments should include a provision that "knowledge or reason to believe" may be shown by proof that any law-enforcement officer has, prior to the commission of the offense with which the defendant is charged, informed the defendant that slugs of the kind were being used unlawfully or fraudulently to operate coin collecting devices designed to be operated by lawful coins of the United States. Both states in 1941 had this provision enacted into the law. In addition, the Ohio statute has a provision to prohibit the advertising of slugs for the operation of illegal machines.

In a Federal District Court an indictment was brought against a man on three counts: (1) for possessing 500 falsely made and counterfeited coins in resemblance and similitude of the genuine five-cent coin of the United States, all with intent to defraud; (2) for the unlawful sale of 100 of said coins, with intent to defraud; and (3) for unlawfully issuing 100 tokens and devices of metal

and its compounds intended to be used as money for and instead of the five-cent piece authorized by law, all without being lawfully authorized to do so.

The facts in this case, as brought out by the district attorney, briefly are as follows: The defendant operated a novelty store where he sold certain coin slugs to the public, purchasing them at wholesale and selling them at some profit. Two types of slugs were involved, one of them selling for $1.00 a hundred and the other, which the defendant called his DeLuxe type, sold for $1.20 per hundred. Thus for $1.20 one might obtain from the defendant's store slugs which if used for nickels would have a "value" of $5.00. In this case the Government presented a comparative table of the contents of the genuine nickel prescribed by Federal statute and the contents of these slugs:

Genuine Nickel		*Coin Slug*	
Copper	75%	Copper	63%
Nickel	25%	Nickel	17.60%
		The remainder consisted of Zinc, Cadmium and Iron.	

The comparative weight and size of the genuine nickel under the Federal statutes and the coin slugs issued by defendant were as follows:

Genuine Nickel	*Coin Slug*
77.16 grains	76.90 grains

There is a variance of weight allowed by statute of 3 grains, so the coin slugs were within the variance allowed by law and may be said to be exactly of the same weight as the genuine nickel. The statute does not fix the dimensions, but the standard diameter and thickness of the genuine nickel as compared with the coin slug were as follows:

	Genuine Nickel	*Coin Slug*
Diameter	.835 inch	.833 inch
Thickness	.078 inch	.075 inch

The coin slugs had inscriptions on one side reading "No cash value" and on the other side "Good for amusement only." The slugs in this respect did not resemble the genuine nickel, and obviously were not intended to be passed physically from hand to hand as money. The mode of use in this case was to pass the coin by a mechanical device which cannot read, and therefore it was immaterial what inscription appeared on the slug. In all other respects the slug so closely resembled the genuine nickel in size, weight, and metal compound that it avoided detection by the mechanical devices used in vending machines and coin telephones.

It was apparent that such slugs were intentionally issued to be used as and in place of genuine five-cent coins. The defendant was found guilty and penalized.

Another case of a concern manufacturing in a big way slugs identical in size with United States coins resulted in the factory being raided by local police in coöperation with Federal authorities. In this factory were found mechanisms of various coin-operated machines, including coin telephones. All slugs were confiscated, and the tools for making them; the makers were subsequently indicted by a Grand Jury, tried in a Federal court, found guilty, and sentenced to imprisonment.

There have been, on the other

hand, cases which Federal judges decided not to bring to trial, apparently believing the laws against counterfeiting were not adequate. This led to an amendment of the counterfeiting laws making the manufacture, sale, or distribution of slugs for fraudulent use illegal. The amendment was approved by Congress on April 1, 1944, and became Public Law No. 278. The law is now incorporated in the revised Title 18 of the United States Code, Section 491, approved June 25, 1948, as Public Law 772. In this amendment there is a provision defining "knowledge or reason to believe" along the same lines as in the state laws of Minnesota and Ohio previously mentioned.

Public Law No. 772 should eliminate the manufacture of slugs as a business venture, although it may be that some will occasionally be made in the kitchens of a few people, just as counterfeit money is sometimes made. To combat the manufacture of slugs for fraudulent purposes should now be much easier because of the heavy penalties for violating the Federal counterfeiting laws.

THE COMBINED EFFECT, from the standpoint of the Bell System, of all these coördinated activities—including the skill of the engineers in improving the coin telephone, the coöperation of legitimate manufacturers, and the assistance of State and Federal authorities—has progressively lessened the slug problem. The temptation to use slugs has been largely eliminated, and the relatively few who still try find it tougher going and with less and less likelihood of success. Bell System losses from slugs are now less than one-tenth of what they were in 1933.

This article must not be construed as reflecting on the American public generally. Its author still believes, despite the evidence here adduced, that most people are honest.

"OUR CONCERN as applied to the telephone companies is not confined to its financial ills as related to our investment needs, because we are free to and do buy something else. We don't have to buy them. But there is another worry there, and I daresay this applies to all business men in the community.

"In New England, to carry on a nation-wide competitive business, we need the very best of service in competition with companies in New York and elsewhere. We are situated at a disadvantage.

"The telephones are most useful, too, in the insurance business. We must have excellent service to remain in a competitive position. Unless the telephone industry can earn a fair return, business and wage earners in our State are injured even more than is the company itself."

From a statement by Lee P. Stack, vice president of John Hancock Mutual Life Insurance Company in charge of finance and investments, before the Department of Public Utilities of Massachusetts, September 28, 1948.

The Annual Bulletin of the A. T. & T. Company Is the Only Publication Which Regularly Summarizes the Number Of Telephones in Service on This Planet

Telephones of the World

James R. McGowan

THE BULLETIN "Telephone Statistics of the World—January 1, 1948," recently issued by the Chief Statistician's Division of the American Telephone and Telegraph Company, shows that at the beginning of this year there were 60,600,000 telephones in service throughout the world, or one telephone for every 38 persons. This compares with one telephone for every 800 persons at the beginning of the century. During the intervening years, the world's population has increased by about 45 percent, while the total number of telephones has grown by almost 3,000 percent. Twenty-nine years after the telephone was invented, the world had six million telephones in service—which was the number added to the global total in the year 1947 alone.

Telephone service has been so developed and improved in recent years that the ideal of universal service seems almost to have been attained. Today, approximately 57,900,000 telephones—a communication network comprising 96 percent of the world's telephones—are potentially within the reach of any Bell System subscriber. Communications experts have worked vigorously and continuously through international telecommunications organizations to standardize equipment and operating methods so that telephone subscribers of each country may be linked with those of other nations, in their homes and places of business, on ocean liners, on coastal and harbor craft, on trains, automobiles, planes.

At the beginning of 1948 there were 34,867,000 telephones in service in the United States, or 57.5 percent of the world's total. During 1947 the United States had a net gain of three and one-quarter million telephones, which was more than half of the increase in the world total. The second largest national network of telephone facilities, that of the United Kingdom, augmented its telephone total by almost 300,000, or five percent of the world's net gain.

In the Western Hemisphere outside the United States, the gain in telephones during 1947 amounted to some 350,000. The combined area of Asia, Africa, and Oceania, which

THE WORLD'S TELEPHONES BY CONTINENTAL AREAS
January 1, 1948[1]

Areas	Total Telephones			Privately Owned		Automatic (or Dial)		Connecting with Bell System	
	Number	% of Total World	Per 100 Population	Number	% of Total Telephones	Number	% of Total Telephones	Number	% of Total Telephones
North America (less United States)	2,717,000	4.5	4.2	2,383,500	87.7	1,560,000	57.4	2,686,000	98.9
United States	34,867,000	57.5	24.2	34,867,000	100.0	20,850,000	59.8	34,854,000	100 #
South America	1,489,000	2.5	1.4	791,500	53.2	1,048,000	70.4	1,400,000	94.0
Europe	17,717,000	29.2	3.0	2,650,000	15.0	11,170,000	63.0	16,400,000	92.6
Asia	1,800,000	3.0	0.2	210,000	11.7	740,000	41.1	680,000	37.8
Africa	660,000	1.1	0.4	9,000	1.4	437,000	66.2	560,000	84.8
Oceania	1,350,000	2.2	1.3	99,000	7.3	820,000	60.7	1,340,000	99.3
World	60,600,000	100.0	2.6	41,010,000	67.7	36,625,000	60.4	57,920,000	95.6

[1] Partly estimated, all data having been adjusted to January 1, 1948.
Less than 0.05 per cent do not connect.

in the aggregate is peopled by more than three-fifths of the world's population, added approximately 400,000 telephones to the total number for those three continents. However, more than one-half of this latter figure represents the net telephone gain in Japan alone.

In a consideration of the world's telephone gain by years subsequent to World War II, it is well to bear in mind the fact that much of the so-called "gain" in number of telephones in service throughout the world, outside the Western Hemisphere, comprises restoration of war-damaged telephone plant. Such gain, therefore, does not in all instances represent new telephone expansion.

Europe, with four times the population of the United States, has one-half as many telephones as we have in this country. By January 1, 1948, Europe, with 3.0 telephones per 100 of the population, had attained approximately the same telephone development as that reached by the United States in the year 1903.

Of all the countries of the world, Belgium has the greatest population density, with 719 inhabitants to the square mile, and has 6.3 telephones per 100 of the population. The United States, with 48 inhabitants to the square mile, has one-fifteenth Belgium's population density but has almost four times its telephone density.

A bulletin on telephone statistics of the world has been published by the A. T. & T. Company each year since 1912, except during those periods of World Wars I and II when telecommunications data on a world basis were not available. Certain of the charts and tables presented in the current publication are reproduced here.

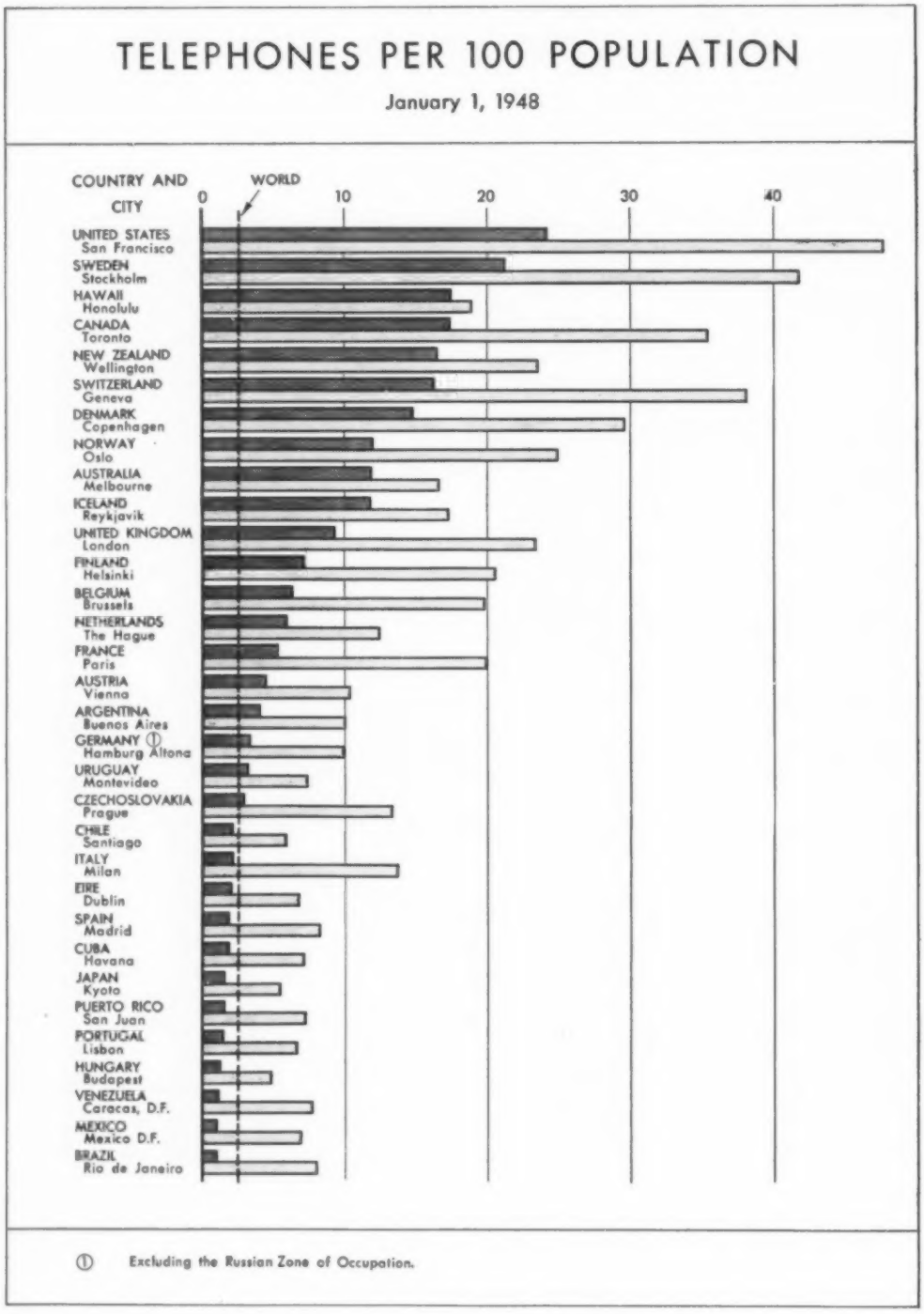
The map reproduced in the bulletin shows the radio network of the Bell System as of January 1, 1948. Your voice can be transmitted from any telephone instrument in the United States to almost any other telephone on any other continent. Although spoken words were first

TELEPHONES IN COUNTRIES OF THE WORLD, JANUARY 1, 1948

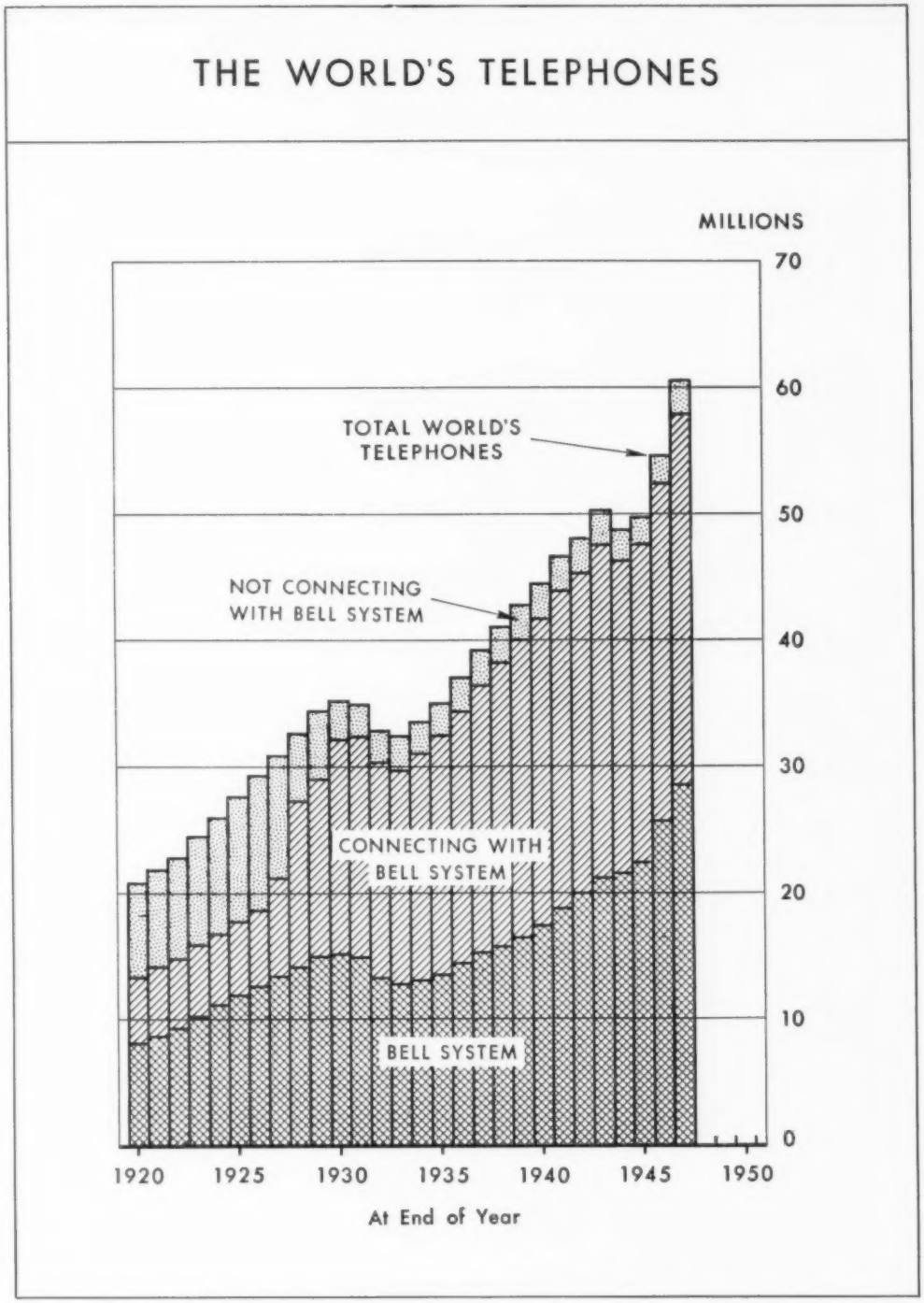
Countries	Total Telephones			Ownership		Automatic (Dial)		Connecting with Bell System	
	Number	Per Cent of Total World	Per 100 Population	Government	Private	Number	Per Cent of Total Telephones	Number	Per Cent of Total Telephones
NORTH AMERICA:									
United States	34,866,758	57.5	24.2	—	34,866,758	20,850,000	59.8	34,853,711	100 [5]
Canada	2,213,400	3.7	17.4	283,500	1,929,900	1,254,400	56.7	2,213,400	100.0
Central America	53,300	**	0.5	29,000	24,300	20,700	38.8	43,000	80.7
Cuba	91,800	0.2	1.8	578	91,222	75,850	82.6	91,800	100.0
Jamaica	9,701	**	0.7	—	9,701	8,875	91.5	8,150	84.0
Mexico	237,000	0.4	1.0	3,000	234,000	160,846	67.9	237,000	100.0
Newfoundland and Labrador	14,760	**	4.6	1,690	13,070	90	0.6	12,300	83.3
Puerto Rico	31,988	**	1.5	1,514	30,474	15,825	49.5	31,988	100.0
Trinidad and Tobago	11,027	**	1.9	—	11,027	6,617	60.0	11,027	100.0
Other Places in North America	54,300	**	0.7	14,300	40,000	16,700	30.8	37,000	68.1
SOUTH AMERICA:									
Argentina	651,082	1.1	4.0	572,582	78,500	470,000	72.2	651,082	100.0
Bolivia	7,800	**	0.2	—	7,800	6,050	77.6	4,741	60.8
Brazil	468,500	0.8	1.0	1,500	467,000	340,000	72.6	421,000	89.9
Chile	119,500	0.2	2.1	—	119,500	78,604	65.8	119,500	100.0
Colombia	57,300	**	0.5	36,000	21,300	19,500	34.0	44,000	76.8
Ecuador	10,000	**	0.3	4,600	5,400	1,200	12.0	1	0.0
Paraguay	4,900	**	0.4	4,900	—	4,200	85.7	4,900	100.0
Peru	43,000	**	0.5	—	43,000	31,845	74.1	30,000	69.8
Uruguay	73,367	0.1	3.2	71,732	1,635	53,014	72.3	73,367	100.0
Venezuela	48,800	**	1.1	1,200	47,600	43,062	88.2	48,800	100.0
Other Places in South America	4,744	**	0.8	4,744	—	128	2.7	3,039	64.1
EUROPE:									
Austria	305,311	0.5	4.4	305,311	—	230,227	75.4	305,311	100.0
Belgium	534,780	0.9	6.3	534,780	—	388,997	72.7	534,780	100.0
Bulgaria	54,347	**	0.8	54,347	—	23,000	42.3	23,000	42.3
Czechoslovakia	350,708	0.6	2.9	350,708	—	208,319	59.4	350,708	100.0
Denmark	617,586	1.0	14.8	[3] 30,948	586,638	250,277	40.5	617,586	100.0
Eire	59,753	**	2.0	59,753	—	34,247	57.3	48,000	80.3
Finland	281,013	0.5	6.9	28,136	252,877	145,703	51.8	281,013	100.0
France	2,108,140	3.5	5.2	2,108,140	—	2,263,331	59.9	2,108,140	100.0

Germany [4]	1,753,000	2.9	3.3	1,753,000	—	960,000	54.8	1,753,000	100.0
Greece	62,900	0.1	0.8	1,000	61,900	61,600	97.9	62,900	100.0
Hungary	106,768	0.2	1.2	106,768	—	77,492	72.6	106,768	100.0
Iceland	15,696	**	11.8	15,696	—	9,596	61.1	15,696	100.0
Italy	958,813	1.6	2.1	—	958,813	857,612	89.4	958,813	100.0
Luxemburg	19,654	**	6.8	19,654	—	14,312	72.8	19,654	100.0
Netherlands	575,995	1.0	5.9	575,995	—	507,151	88.0	575,995	100.0
Norway [2]	376,503	0.6	12.0	310,192	66,311	218,420	58.0	376,503	100.0
Poland	192,156	0.3	0.8	192,156	—	127,500	66.4	135,000	70.3
Portugal	114,818	0.2	1.4	34,272	80,546	54,988	47.9	114,818	100.0
Romania [1]	127,153	0.2	0.8	1,022	126,131	96,402	75.8	127,153	100.0
Spain	509,993	0.8	1.8	—	509,993	367,576	72.1	509,993	100.0
Sweden	1,450,478	2.4	21.2	1,448,470	2,008	853,665	58.9	1,450,478	100.0
Switzerland	744,997	1.2	16.3	744,997	—	692,542	93.0	744,997	100.0
United Kingdom [3]	4,654,500	7.7	9.3	4,654,500	—	3,202,500	68.8	4,654,500	100.0
Other Places in Europe	1,800,000	3.0	0.7	1,800,000	—	555,000	30.8	580,000	32.2
ASIA:									
China	244,028	0.4	**	84,028	160,000	178,000	72.9	170,000	69.7
Japan [3]	1,195,238	2.0	1.5	1,195,238	—	366,221	30.6	356,600	29.8
Korea [1]	75,134	0.1	0.3	75,134	—	24,871	33.1	22,600	30.1
Turkey	43,114	**	0.2	43,114	—	36,000	83.5	0	0
Other Places in Asia	290,000	0.5	**	240,000	50,000	150,000	51.7	150,000	51.7
AFRICA:									
Algeria	75,670	0.1	0.9	75,670	—	49,634	65.6	75,670	100.0
Egypt [1]	99,814	0.2	0.4	99,814	—	66,009	66.1	70,000	70.1
Morocco	45,153	**	0.5	36,553	8,600	28,800	63.8	39,780	88.1
Tunisia	19,729	**	0.6	19,729	—	12,296	62.3	15,000	76.0
Union of South Africa	335,000	0.6	2.9	335,000	—	245,000	73.1	330,000	98.5
Other Places in Africa	80,700	0.1	**	80,400	300	31,400	38.9	30,000	37.2
OCEANIA:									
Australia [2]	905,017	1.5	11.9	905,017	—	538,438	59.5	903,000	99.8
Hawaii	92,076	0.2	17.5	—	92,076	84,730	92.0	92,076	100.0
New Zealand [3]	300,552	0.5	16.5	300,552	—	172,830	57.5	299,002	99.5
Philippine Republic	6,917	**	**	—	6,917	5,419	78.3	5,650	81.7
Other Places in Oceania	34,000	**	**	34,000	—	3,900	11.5	27,000	79.4

[1] January 1, 1947.
[2] June 30, 1947.
[3] March 31, 1948.
[4] Excluding the Russian Zone of Occupation.
** Less than 0.1.
[5] Less than 0.05% do not connect.



This chart shows relative telephone development of principal countries of the world and certain major cities



Growth of connecting telephones during the past two decades reflects the extension of overseas service

TELEPHONE DEVELOPMENT OF LARGE CITIES, JANUARY 1, 1948

Country and City (or Exchange Area)	Estimated Population (000's Omitted)	Number of Telephones	Telephones per 100 Population
ARGENTINA:			
Buenos Aires	4,065	406,228	10.0
AUSTRALIA:			
Adelaide	383	51,000	13.3
Brisbane	402	56,840	14.1
Melbourne	1,227	204,039	16.6
Sydney	1,484	238,983	16.1
AUSTRIA:			
Vienna	1,550	163,117	10.5
BELGIUM:			
Antwerp	573	57,669	10.1
Brussels	930	183,905	19.8
Liege	363	31,387	8.6
BRAZIL:			
Rio de Janeiro	2,160	172,874	8.0
Sao Paulo	1,720	93,369	5.4
CANADA:			
Montreal	1,219	293,253	24.1
Ottawa	255	71,651	28.1
Toronto	911	322,980	35.4
Vancouver	391	113,278	29.0
Winnipeg	352	76,136	21.6
CHILE:			
Santiago	1,104	64,553	5.8
CHINA:			
Shanghai	4,494	94,945	2.1
CUBA:			
Havana	900	64,195	7.1
CZECHOSLOVAKIA:			
Prague	921	122,273	13.3
NETHERLANDS:			
Amsterdam	814	83,592	10.3
Haarlem	201	17,298	8.6
The Hague	600	74,566	12.4
Rotterdam	723	56,747	7.8
Utrecht	205	18,510	9.0
NEW ZEALAND:[3]			
Auckland	275	42,979	15.6
Wellington	185	43,391	23.5
NORWAY:[1]			
Oslo	424	105,422	24.9
PORTUGAL:			
Lisbon	794	52,123	6.6
Oporto	324	17,664	5.5
SPAIN:			
Barcelona	1,225	79,581	6.5
Madrid	1,276	104,300	8.2
Seville	375	15,174	4.0
Valencia	520	17,132	3.3
SWEDEN:			
Göteborg	337	103,858	30.8
Malmö	181	48,462	26.8
Stockholm	889	371,399	41.8
SWITZERLAND:			
Basel	172	61,107	35.5
Bern	144	53,952	37.5
Geneva	126	48,032	38.1
Zurich	405	116,946	28.9
UNITED KINGDOM:[3]			
Belfast	453	32,720	7.2
Birmingham	1,290	107,260	8.3
Edinburgh	488	68,320	14.0
Glasgow	1,202	103,570	8.6
Kingston upon Hull	346	25,302	7.3

DENMARK:			
Copenhagen	973	288,214	29.6
EIRE:			
Dublin	513	34,247	6.7
FRANCE:			
Bordeaux	254	31,314	12.3
Lille	210	22,494	10.7
Lyon	545	60,502	11.1
Marseille	636	53,247	8.4
Paris	2,734	545,000	19.9
GERMANY:			
Berlin	3,253	86,684	2.7
Bremen	405	29,188	7.2
Frankfort-on-Main	535	42,495	7.9
Hamburg-Altona	1,469	145,450	9.9
Munich	842	38,110	4.5
HAWAII:			
Honolulu	268	50,607	18.9
HONG KONG[2]	1,500	19,974	1.3
HUNGARY:			
Budapest	1,500	72,031	4.8
ITALY:			
Florence	371	36,022	9.7
Milan	1,267	173,850	13.7
Naples	1,020	25,327	2.5
Rome	1,600	203,083	12.7
Venice	303	16,680	5.5
JAPAN:[3]			
Kobe	664	22,130	3.3
Kyoto	1,029	55,669	5.4
Nagoya	899	25,938	2.9
Osaka	1,652	70,060	4.2
Tokio	4,385	153,547	3.5
MEXICO:			
Mexico, D.F.	1,830	126,340	6.9
Liverpool	1,427	105,720	7.4
London (City and County of)	3,391	788,870	23.3
Manchester	1,200	120,800	10.1
Newcastle on Tyne	492	40,080	8.1
Sheffield	508	39,730	7.8
URUGUAY:			
Montevideo	730	53,014	7.3
UNITED STATES:			
New York	7,888	2,458,102	31.2
Chicago	3,700	1,396,387	37.7
Los Angeles	1,950	740,943	38.0
Cleveland	1,313	458,380	34.9
Pittsburgh	1,035	346,836	33.5
Total 9 exchange areas with more than one million population	22,355	7,342,777	32.8
Washington, D. C.	942	410,072	43.5
San Francisco	836	398,712	47.7
Boston	738	275,121	37.3
Minneapolis	600	237,810	39.6
Seattle	570	235,646	41.3
Total 16 exchange areas with 500,000 to one million population	10,651	3,753,022	35.2
Portland (Oregon)	472	167,674	35.5
Denver	410	164,259	40.1
St. Paul	358	132,184	36.9
Hartford	274	111,265	40.6
Oklahoma City	272	97,314	35.8
Total 37 exchange areas with 200,000 to 500,000 population	11,701	3,546,457	30.3
Total 62 exchange areas with more than 200,000 population	44,707	14,642,256	32.8

NOTE: There are shown, for purposes of comparison with cities in other countries, the total development of all cities in the United States in certain population groups, and the development of certain representative cities within each of such groups.

[1] June 30, 1947. [2] September 30, 1947. [3] March 31, 1948.

Problems other than those of a technical nature have been encountered during the years of effort to standardize international communication service. The Marconi Wireless Company vainly sought in 1931 for a Mohammedan who was an expert radio engineer. A contract had been signed with King Ibn Saud for the construction of a radio station in Mecca, but no one of a faith other than Mohammedan was allowed to enter the sacred city to carry out the work. Thus was the sudden Arabian leap from the archaic to the modern —from the centuries-old methods such as messenger on camel following a time-worn trail—made complicated. To solve the problem, King Ibn Saud sent four of his subjects to England for a course of instruction in the new electronic methods of communication.

successfully sent across the ocean in 1915, another 12 years were needed before overseas telephony was sufficiently stable to be offered to the public. When New York and London were first connected for commercial radiotelephone service, in January, 1927, the cost of a three-minute conversation was $75. Some 2,000 calls were flashed across the Atlantic that year. By 1939, the cost of a similar call had been brought down to $12, and most territories of the world were within voice reach of the United States. In 1947, half a million radio-borne conversations were made between the United States and points overseas.

INTERESTING PROBLEMS are not infrequently encountered during the process of gathering facts for a presentation of statistics on world telephone development.

Data in the bulletin are shown, in so far as possible, as of the end of the calendar year. However, many of the large foreign administrations make their statistics available as of the end of their fiscal years, which of course vary; and other administrations do not make their official statistics available until eighteen months after the end of the period under consideration. Adjustments are therefore necessary in summarizing world totals as of the beginning of the year. Disparity in the time element requires still other adjustments in arriving at equitable development figures in comparison of telephones in respect to population; for censuses, being time-consuming and costly, are taken only at long intervals. Attention must be given to intercensal growth rates coupled with annual official demographic statistics such as those pertaining to birth and death rates; to gains and losses through international migration; to population shifts due to changes in land areas; to long and short-term economic factors; and to other important considerations.

Official figures obtained direct from foreign administrations or companies are used whenever they can be procured. Not only are some 400 foreign correspondents queried by letter and questionnaire for statistical data, but annual reports and technical magazines published in any one of several languages and issued by the various administrations or by private operating companies are read and annotated, as are governmental statistical abstracts and demographic bulletins. Publications issued by the

Bureau of the International Telecommunications Union at Bern, Switzerland, are read for items of current interest, such as changes in the personnel or the corporate structure of telecommunications organizations. An address file of all regular correspondents is maintained.

In some cases estimates must be resorted to, nonetheless, and, where these are necessary, many factors are taken into consideration. A file is maintained on news items of those events throughout the world which may affect telecommunication or population data. Widespread disasters, such as hurricanes; innovations, changes in ownership, traffic data, conferences, new construction, war damage, manufacturing output—reports on all such are taken into account in an effort to arrive at fair estimates. Official data published subsequent to such estimates have shown the estimated figures to have been gratifyingly close.

Communicating with European administrations is relatively simple, for the majority of the telephone systems on that continent are under single administrations and the information is, therefore, readily available. In some countries, however, many organizations must be queried for the required data. Telephone development statistics of the some 5,800 non-Bell telephone companies operating throughout the United States, as well as those of the Bell System, on the other hand, are obtained without difficulty. Standardized terms and uniform systems of reporting telephone development data in the United States simplify the assembling of such statistics for the total industry in this country.

Still other considerations complicate the work of assembling telephone data. Certain administrations —fortunately they are few—are reluctant to supply information. One or two reply that, to their regret, the desired information is not available. One or two, notably the U. S. S. R., have never replied at all. It may be added that, possibly by way of compensation, an occasional estimate affably supplied is all too obviously founded upon conjecture and facile assumption rather than upon harsh fact. Such estimates are apt to err on the side of generosity.

In compiling traffic data, it is noted that many foreign telephone systems have various categories of calls, such as those with *Avis d'appel* or *Preavis* (messenger calls), "lightning" calls, urgent calls, and fixed time calls, which are charged for at higher rates and have priority over ordinary messages. In times of peace, all calls in the United States are on a lightning or urgent basis, without priorities, and are charged for at the normal or ordinary rate.

THE ANNUAL SURVEY of world telephones published by the American Telephone and Telegraph Company is the only publication which summarizes the number of telephones throughout the world. Inasmuch as world totals of telephone development do not appear in any other publication, this survey has, in the past, been extensively reprinted and analyzed, both in the United States and abroad.

Twenty-five Years Ago in the

BELL TELEPHONE QUARTERLY

Items from Volume II, Number 3, October 1923

Dr. F. B. Jewett Addresses Pacific Coast Meeting from New York

ON OCTOBER 4TH, the Pacific Coast Convention of the American Institute of Electrical Engineers met in Del Monte, California, to confer the Edison Medal, and as President of the Institute at the time the award was made, it was the duty of Dr. F. B. Jewett to make the presentation speech. The medalist this year is Professor R. A. Millikan of the California Institute of Technology. As Dr. Jewett was unable to leave New York, arrangements were made to transmit his speech over the transcontinental telephone line. The Pacific Telephone and Telegraph Company installed loud speaking equipment at Del Monte so that the entire convention could hear the speech.

From "Notes on Recent Occurrences."

World's Telephone Statistics, 1922

DURING the year 1921, 1,083,409 telephones were added to the telephone systems of the world, an increase of 5.2%, bringing the total number of telephones in the world on January 1, 1922 to 21,948,960. Of this total, 13,875,183, or 63.2%, were in the United States, of which 13,380,219, or 96%, were connected to the Bell System. The number of telephones in all the countries of Europe combined was 5,606,252, or 25.5% of the world's total; all other countries had 2,467,525, or only 11.3% of the world's telephones. At the beginning of 1922, the total number of telephones in the world was equivalent to 1.3 for each 100 of the world's population, as against 1.2 at the beginning of 1921. . . .

Over one-half of the total net gain in the telephones in the world during 1921 occurred in the United States; and this despite the fact that the extent of telephone service relative to population is very much greater in the United States than in any other country. In all Europe the gain in telephones during 1921 was only 342,085, as compared with 545,804 in the United States. On January 1, 1922, Europe still had but 1.2 telephones per 100 population, as against 12.7 in the United States on the same date. The relative number of telephones in Europe today is no greater than that which existed in the United States in 1900.

From an article by Seymour L. Andrew, former A. T. & T. Chief Statistician.

Beginning of Policy of Selling Service and Not Instruments

THE GREATEST THING that Gardiner Greene Hubbard did in his administration of the telephone was establishing the business policy of the telephone on the principle of renting telephones and not selling them. As attorney for the Gordon MacKay Shoe Machinery Company he saw that principle in practice. He realized that it was the wisest principle on which to build up the telephone business. As he was Trustee, he was able to adopt it without gaining first the consent of anyone, and he held to it persistently against both the severe pressure of lack of money and the united opposition of all the others con-

cerned. Even Mrs. Hubbard, his own wife, at one time went to Mr. Watson in the shop to beg him to join them and to add what influence he might have with Mr. Hubbard to persuade him to sell telephones instead of renting them, so much more money would be received in that way and they needed money so badly. But Mr. Hubbard stood firm. He had the power and nothing could move him from the policy. And the whole business structure of the Bell System is built upon his position; if he had yielded, it could not have been. The renting of telephones led to the licensing system, and the licensing system led to the sale of service only. This indifference to money, so characteristic of him, was the concomitant of his far-sighted wisdom and his determination to bring the right thing about.

From "Two Founders of the Bell System" by the late W. C. Langdon, A. T. & T. Historical Librarian.

Catalina Radio Telephone System Superseded by Submarine Cable

THE radio telephone system which for the past three years has connected the Island of Santa Catalina with the rest of the Bell Telephone System was closed down on August first. An enlarged service to the Island is now being given over two submarine telephone cables, which were laid to the Island a few weeks before the closing of the radio.

The passing of this radio system is of more than usual interest, both from an historical and a technical standpoint. It was the first, and so far as known, the only radio telephone system which has ever given a commercial telephone service, meeting in both transmission and signaling (although not as regards secrecy or economy) the ordinary requirements of wire telephone circuits. . . .

Some six weeks before the radio was taken out of service, a "privacy" system was installed in connection with it. In this system the transmission was sent out in such form that the ordinary radio receiving sets could not pick up the messages and convert them into understandable speech. The system was not "secret" in the sense that one familiar with the methods used could not construct a set which could listen to it. Such a set, however, would be much more complicated than the ordinary set, and the added complication would be of no value except for picking up transmission over the system. It gave a degree of privacy, therefore, something comparable to that obtained by a lock and key, which may not prevent a property from being broken into, but which does, in general, furnish a high degree of privacy to it.

From "Notes on Recent Occurrences."

Who's Who & What's What

(Continued from page 139)

charge of a newly organized section of the department, the position he now holds. His previous contributions have been "Office Standards and Costs as Applied to Public Utilities," in the Bell Telephone Quarterly for April 1930, and "Bills for 13,000,000 Customers," in this MAGAZINE for February 1942.

VARIOUS ASSIGNMENTS in the Plant Department of the Southwestern Bell Telephone Company, including central-office repairman, division plant engineer, general plan installation supervisor, and general plant training supervisor, occupied ERLE MINER from 1922 to 1929. This experience gave him a first-hand view of the System's training and safety programs from both the practical and the administrative standpoints. In 1929 he was transferred to the Department of Operation and Engineering of A. T. & T., to work on plant training problems, and in 1937 he became safety engineer—the position he now holds. His most recent previous contribution to this MAGAZINE was "The Bell System's Safety Observation Plan," published in the Summer 1944 issue.

BORN IN Torquay, England, and educated in that country, H. MONTAGUE POPE had been engineer of outside plant construction in South Wales for the National Telephone Company before coming to the United States in 1909. Here he became a plant engineer for the former New York and New Jersey Telephone Company. After military service in World War I he was transferred to the commercial engineer's staff, and in 1921 he became a member of the Department of Operation and Engineering of the A. T. & T. Company. In 1933 he was appointed commercial problems engineer, and ran smack up against the problems he discusses in this issue. This is not his first contribution to this MAGAZINE, for his "Independent Telephone Companies" appeared in the issue for May 1941; but it is his last, for Monty Pope retired from the company on September 30.

FOR THE third consecutive year since the war, and for the third time from the pen of JAMES R. MCGOWAN, telephone statistics of the world are back in the pages of this MAGAZINE. Mr. McGowan's eleven years of A. T. & T. service with the Chief Statistician's Division, devoted to studying and reporting on the statistics and economics of foreign telephone development, were interrupted by more than four years of military duty, spent in statistical and administrative work with the Signal Corps in Washington and with the Economics Division of Military Government in Berlin.

PRINTED IN U. S. A.